

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

No. 224. (No. 15, Vol. V.)

APRIL 12, 1913.

[Registered at the G.P.O. as a Newspaper.] [Weekly, Price 3d. Post Free, 3d.]

Flight.

Editorial Office: 44, ST. MARTIN'S LANE, LONDON, W.C.
Telegrams: Truditur, Westrand, London. Telephone: Gerrard 1828.
Annual Subscription Rates, Post Free.
United Kingdom ... 15s. od. Abroad ... 20s. od.

CONTENTS.

Editorial Comment:	PAGE
The Franco-German Zeppelin "Incident" ...	401
Stream-Line Bodies ...	402
Men of Moment in the World of Flight: Mr. J. Radley ...	403
The Radley-England Waterplane (with scale drawings) ...	406
Royal Aero Club. Official Notices ...	410
Upside Down in Mid Air ...	411
From the British Flying Grounds ...	412
Flying at Hendon ...	413
"Put not your Trust in Dreadnoughts" ...	415
Armchair Reflections. By the Dreamer ...	416
Nature's One-Winged Fliers... ..	417
The Monaco Meeting	418
British Notes of the Week	419
Foreign Aviation News	420
Models. Edited by V. E. Johnson, M.A.	421
Correspondence... ..	422

EDITORIAL COMMENT.

The Franco-German Zeppelin "Incident."

With the recent "incident" of the straying of a German Zeppelin dirigible across the French frontier and its passive landing in the midst of a manœuvring cavalry regiment, now happily closed to the satisfaction of both parties, it is difficult to look back upon it and say with any certainty which side of it appeals the most—the humorous or the tragic. Certainly it has both aspects, and it is perhaps natural that the former should at first make the strongest impression on the mind of the detached spectator who has no particular interest in the incident save as a mere matter of every-day news. For long enough the Germans have patted themselves on the back in the belief that they were ahead of the whole world in their knowledge of the dirigible, its construction and its capabilities. They possessed secrets which they believed were priceless, and they left nothing undone to retain those secrets safely locked up to the east of the Vosges. Not only were those secrets jealously guarded by those who were perforce made acquainted with them, but the most touching appeals were made

through the Press of the Empire to the sense of patriotism of the people not to even whisper the word "Zeppelin" in the hearing of strangers, lest perchance some one of the invaluable secrets might be given away to the potential enemy. And by the cruel irony of fate, before the ink was dry which conveyed the last of these appeals to the nation, the very latest of the Zeppelins, embodying all that is known in Germany of the science of aerial navigation by lighter-than-air craft, was quietly and gracefully handed over to the French for inspection at their leisure. Surely, nothing quite so humorous—viewing it from that standpoint—has happened for many years! No wonder the German Press is in hysterics of grief over the "aerial Jena," as it has been not inaptly called!

But let the Germans take heart from sober reflection. We imagine that the German General Staff is under very few delusions as to the amount of secrecy which exists with regard to the design of the Zeppelin. While it is very possible that the French air corps has learnt something from the courteous visit of "Z 4" to Luneville, it is equally certain that the German Press has rather exaggerated the ignorance of experts outside Germany of the details of Zeppelin construction. Possibly some few secret details have been given away, but the matter is probably not a quarter so serious as Press opinion in Germany appears to imagine. The real lesson for the Germans to bear in mind seems to us to be that they should take care next time not to stray too far from home in foggy weather!

Apart from the humour of the incident, it has its very serious side, and particularly for ourselves, who were not directly concerned in it. And we are something more than pleased to notice that the lesson has been taken to heart by the responsible Press of this country. Not so very long ago—a matter of weeks, perhaps—the incident would have furnished a text for gibes at the dirigible in general and the Zeppelin in particular. It would have been pointed out how foolish are the Germans to continue to build aircraft that wreck themselves every time they are taken out in a stiff breeze and that stray over frontiers in the fog and come down to Mother Earth like winged partridges, to quietly present the hated enemy with all the secrets of their construction. But nowadays a more judicial state of mind prevails. The Press of the country has come to realise that where a new science like aerial navigation is concerned experience has to be bought, and that in the repeated wrecks of their big airships the

Germans have only been paying the price of that experience which has given them a substantial lead over other countries where this type of aircraft is concerned. Germany has only been undergoing in the air what America and France and ourselves went through in the evolution of the submarine, except that in the latter case there was not so much said about the failures, and only the successes were made known, and then very meagrely.

And, having paid the price demanded, with their eyes wide open, the Germans have done what they set out to do—to lead the world in dirigible construction. It is useless to blink apparent facts, and that this is the solid, cold-drawn truth admits of no argument.

Now, what is the lesson that we have to learn and digest? Briefly and simply it is this, that if a Zeppelin airship can travel from Friedrichshafen to Luneville, it can equally accomplish the voyage from Cuxhaven to Sheerness, Harwich, or even Portsmouth or Devonport. It is beside the point to argue that "Z 4" was a lame duck when she came to earth at Luneville. The cold fact is that she did arrive there, and that in getting there she had passed over certain of the French frontier fortresses, and that what has been done once can be done again and yet again. True, if the political relations between France and Germany were in such a state of tension that war was to be apprehended, the French air-fleet would have something to say in such a matter. The mere presence of a German aircraft on the wrong side of the frontier would in all probability be taken as a legitimate *casus belli*—and the fortune of war would decide whether the Zeppelin accomplished its mission or not. That is why the French have an air-corps. They were the first to realise that attack from the air can only be efficiently and properly met in the air. But if British dockyards or towns were the objective instead of French fortresses, how much of the "fortune of war" would there be in it? We have no air service like that of France to fend off an attack. Our diminutive dirigibles would be worse than useless, for their employment would simply mean the loss of lives that could ill be spared. Our aeroplane fleet, save the mark, might do something, but it is quite unknown yet whether or not the dirigible can be out-fought by the aeroplane. So far, the idea is that it should in part be met by craft of its own character.

Nothing but the actual shock of war can tell us definitely how things will work out. It is not of great use theorising in the absence of any kind of data. The safest, nay, the only course in the first instance, is to build dirigibles to fight dirigibles. That lesson seems slow to penetrate the minds of those in authority, which to us is more than a little strange. Supposing, for the sake of apt comparison, we, or any other reputable organ of public opinion, were to suggest to the Admiralty that the millions spent on building battleships for the express purpose of fighting battleships were absolutely wasted, and that if we spent half the money on small torpedo craft to fight the enemy's capital ships we should be quite safe, and save into the bargain. What would be said by naval experts?

The answer is so self-evident that we need not trouble to set it down. And yet that is precisely what we are doing in the air; or, to be more exact, we are *talking about* building a handful of aerial torpedo craft in readiness to fight battleships! *Quos Deus vult perdere, prius dementat.*

Stream-line Bodies.

An interesting letter from a correspondent in the current issue ought to be read with appreciation by several of our other correspondents, who have been labouring with the problem of fair-shaped bodies mainly through the exercise of their imaginations. It is highly meritorious to use the imagination at all times, but it is also very desirable to feed it now and again on solid items of fact. Thus, in connection with fair-shaped bodies there is now a certain amount of information which it is impossible to disregard. Tests have been conducted at the National Physical Laboratory, and the results thereof have been published in the Technical Report of the Advisory Committee. In the last Technical Report are some photographs illustrating the fluid flow around various strut sections. Rough sketches which accompany our correspondent's letter are substantially correct in giving a general idea of the result of three specific cases.

They emphasise the turbulence in the wake of the obstruction, and they show how important is the tail portion of any fair-shaped body. In dealing with strut sections from a practical standpoint, it is, of course, primarily necessary to bear in mind that the main object of a strut is to be strong and also to be light. The question of weight, however, is also bound up with resistance, because if it is possible to save one pound in resistance it is possible, on most machines, to carry an extra six pounds weight by virtue of this saving. The reason for this is that most machines nowadays have a gliding angle that is at least one in six, which means to say that a pound resistance is as much of an obstruction to motion as six pounds weight in flight. It is assumed, of course, that the extra dead weight is hidden inside some obstruction that already exists, and does not add thereto the resistance of its own form.

The problem of designing fair-shaped bodies for dirigibles is complicated by considerations of gas-carrying capacity in addition to strength and resistance, while in the case of a fair-shaped body for the purpose of enclosing the engine and the pilot on an aeroplane there is the fact that both objects to be enclosed already possess a certain size.

In analysing the nature of the resistance of a fair-shaped body, there are two points of view that deserve consideration. One of them assumes that the resistance is of two parts, that due to friction and that due to form. The alternative line of thought regards the resistance as indivisible.

Of the two arguments the latter, in so far as it affects long bodies, is, we think, best supported by experimental evidence. Those who favour the division of streamline resistance into friction and form are faced with the necessity of supposing that the *whole* of the frictional resistance is given by *Zahm's* formula and coefficient. The remainder is thus arbitrarily assigned to the projected area of the cross-section, and, therefore, is assumed to conform to the V^2 law as being related to the pressure on a flat plate.

Zahm's formula, as corrected by the N.P.L., is

$$F \text{ lbs.} = .0000082 A^{0.98} v^{1.86},$$

while the face pressure formula for a flat plate is

$$F \text{ lbs.} = \frac{.62}{400} A v^2.$$

In the above expressions the term *A* in the first case relates to the exposed surface, and in the second place to the area of the projected cross-section.

Assuming that the frictional formula is to be applied as it stands without altering the numerical value of the

APRIL 12, 1913

FLIGHT

MEN OF MOMENT IN THE WORLD OF FLIGHT. Pilot-Constructor.



MR. J. RADLEY.

coefficient, then it is apparent that the face pressure formula must have its coefficient changed to suit the form of the object. This change in the coefficient can only be determined by experiment.

It is, however, a matter of interest to find that when the resistances of long, fair-shaped bodies are studied without any attempt to divide them into separate parts, the resistance as a whole approximates to the character of Zahm's formula, having, however, an entirely different coefficient. Thus, for example, in a series of dirigible forms tested at the N.P.L., the coefficients varied from '0000124 to '0000165, that is to say, the amount of friction calculated by Zahm's formula and coefficient would have been from 50 to 75 per cent. of the total measured resistance.

Now, whichever way the problem is regarded, it is evident that each particular shape needs its own particular coefficient, and since the nature of the resistance as a whole appears to follow the frictional law for long streamline bodies, there seems to be very little point in dividing it up into two parts.

Zahm's experiments, it must be remembered, were

⊗ ⊗

ROYAL FLYING CORPS.

THE following appointment was notified in the *London Gazette* of the 4th inst. :—

R.F.C.—Military Wing.—Second Lieutenant Robert R. Smith-Barry is confirmed in his rank.

The Admiralty announced the following appointment on the 4th inst. : Carpenter J. J. Brownridge to the "Acteon," additional, for training in repairing aeroplanes ; to date April 3rd.

Motto for the R.F.C.

IN the April Army Orders it is announced that His Majesty the King has been graciously pleased to approve of the Royal Flying Corps being permitted to adopt the motto "Per Ardua ad Astra" (Through Toil to the Stars).

conducted on flat plates, and it is only to be expected that a flat plate should present its surface in the most advantageous manner from the standpoint of low resistance. It does not seem necessary to identify all sorts of frictional surfaces with Zahm's coefficient or necessarily justifiable to argue that the amount so earmarked in respect to the exposed surface of a fair-shape is a complete expression of the frictional part of the force in question. Indeed, from the fact that the whole resistance of such bodies seems to adhere closely to the frictional law, it would seem that the whole resistance is frictional by nature, although not so little in amount as if the surface were presented as a perfectly flat plate.

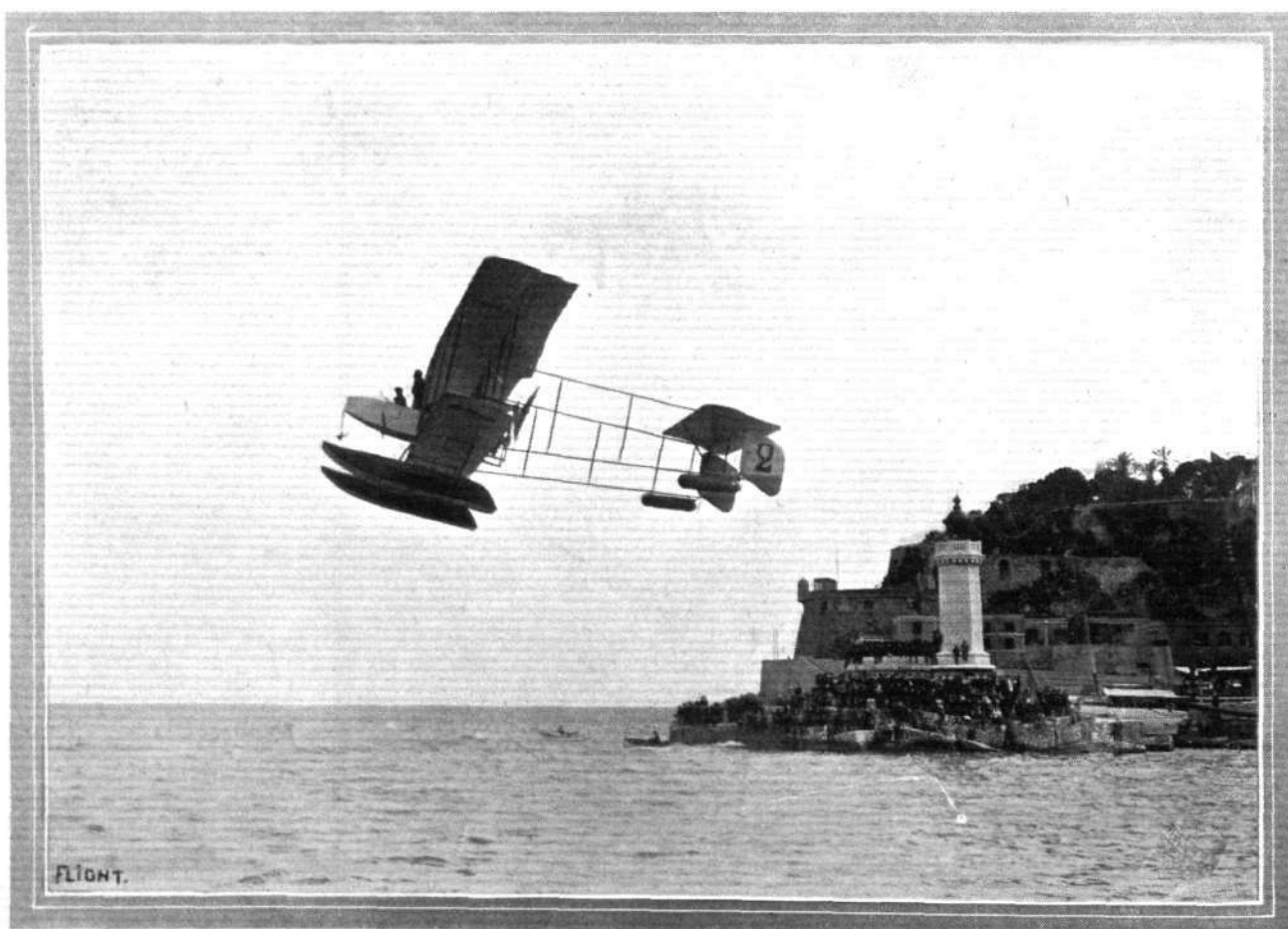
The shapes to which the above remarks have reference all possess a considerable fineness ratio (length to diameter), the least of the series being 4'2. In strut sections and shapes that have quite a low fineness ratio, it is not to be expected that the above should hold true, inasmuch as the ratio of the exposed surface to the projected area is so much less, and the deadwater region in the wake is, ordinarily, much more pronounced.

⊗ ⊗

QUESTIONS IN PARLIAMENT.

ON Wednesday of last week in the House of Commons, Mr. Joynson-Hicks asked the Prime Minister whether his attention had been directed to the German army and navy estimates, in reference to their proposed increase in the preparations for aerial warfare ; and, as our existing Estimates were framed without knowledge of these preparations, what steps he proposed to take to place Great Britain in a position adequately to defend her shores against possible attack.

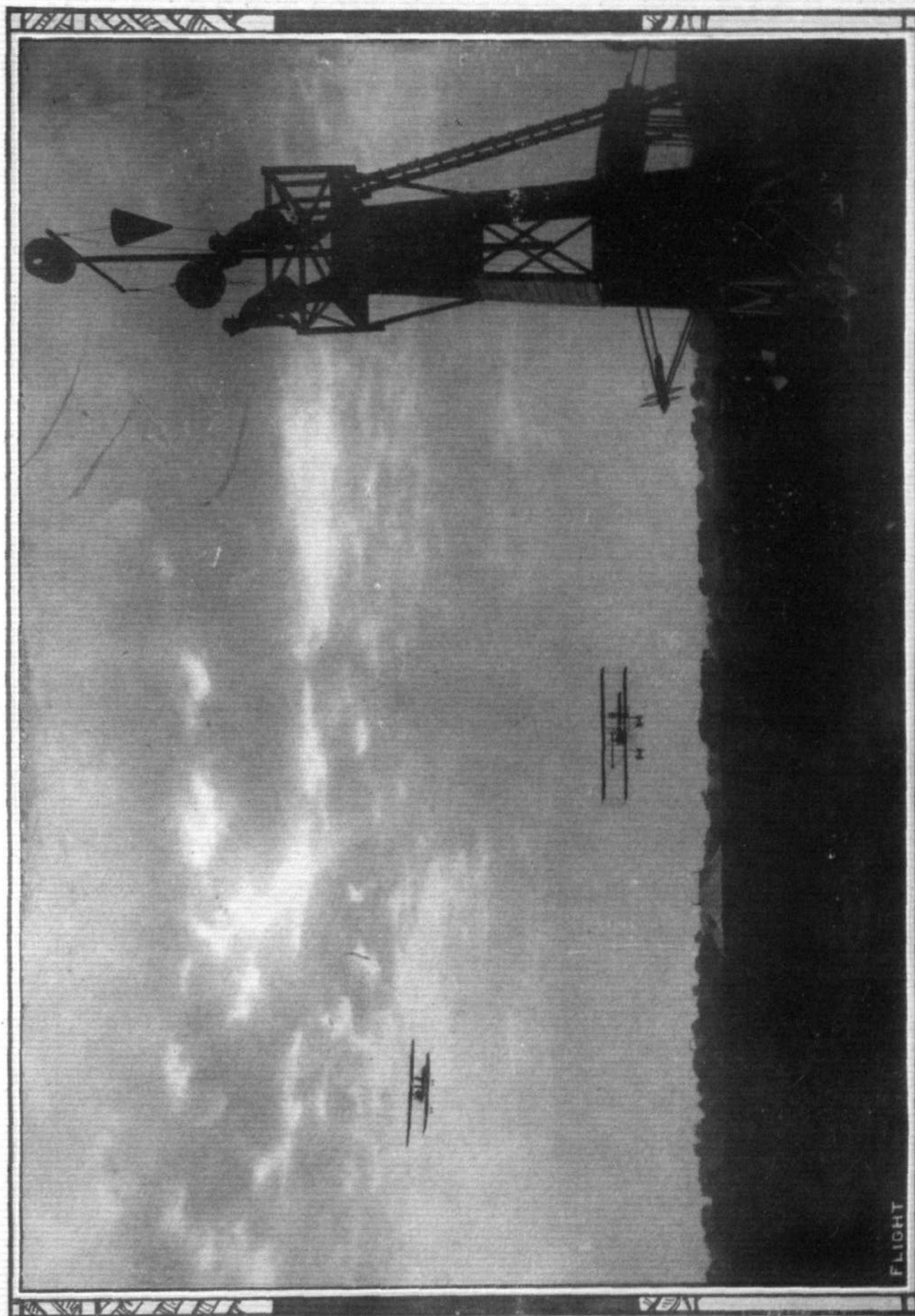
Mr. Asquith replied : All new facts arising after the presentation of the Estimates of the year which may affect the naval or military position are considered by the Departments concerned, and any further action which is found necessary can and will be taken without delay.



The latest Henry Farman hydro-aeroplane in flight at the Monaco Meeting.

APRIL 12, 1913.

FLIGHT

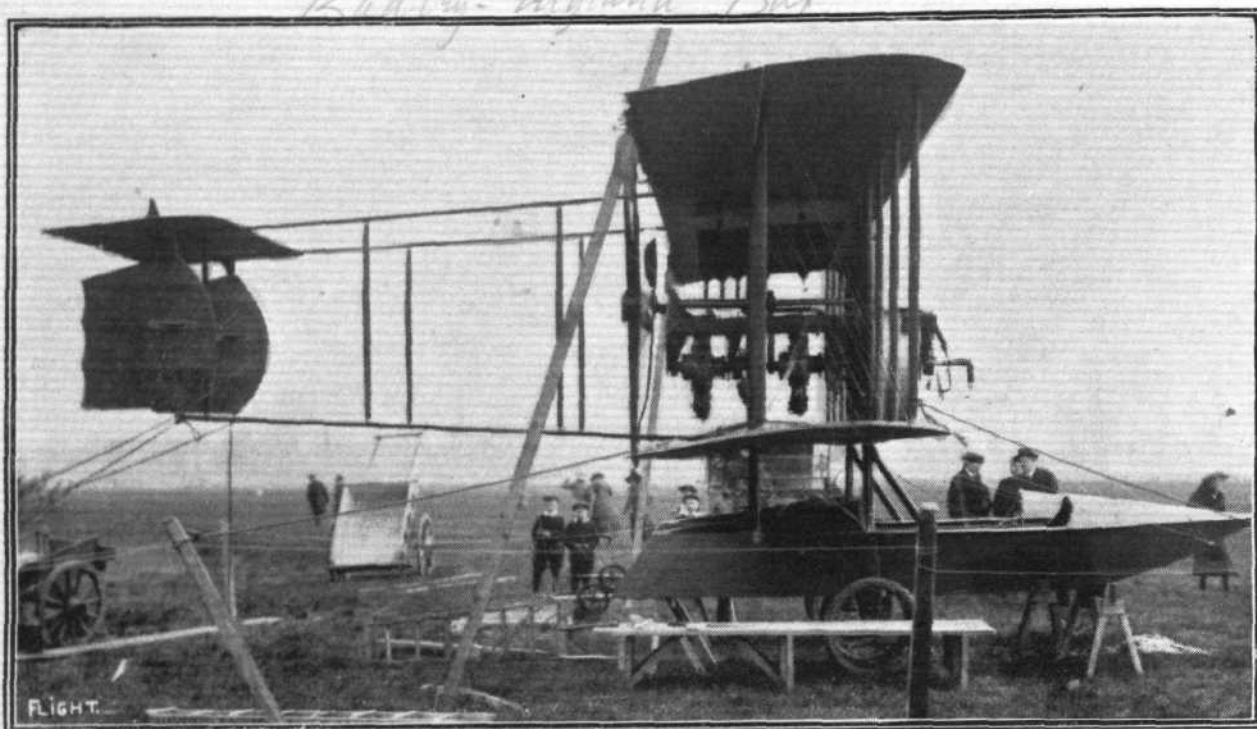


A REMINISCENCE OF HENDON FLYING MEETINGS.—A good race between Lewis Turner on the Crampt-White biplane and W. H. Ewen on the Caudron.

THE RADLEY-ENGLAND WATERPLANE.

A NEW British-built waterplane of great interest has been constructed at Huntingdon by James Radley in collaboration with Gordon England, who is acting as his engineer and designer. Both have had great experience in aviation,

machine in which the accommodation for six passengers has been provided at the outset, and has formed of necessity a basic factor governing the proportions of the aeroplane as a whole.



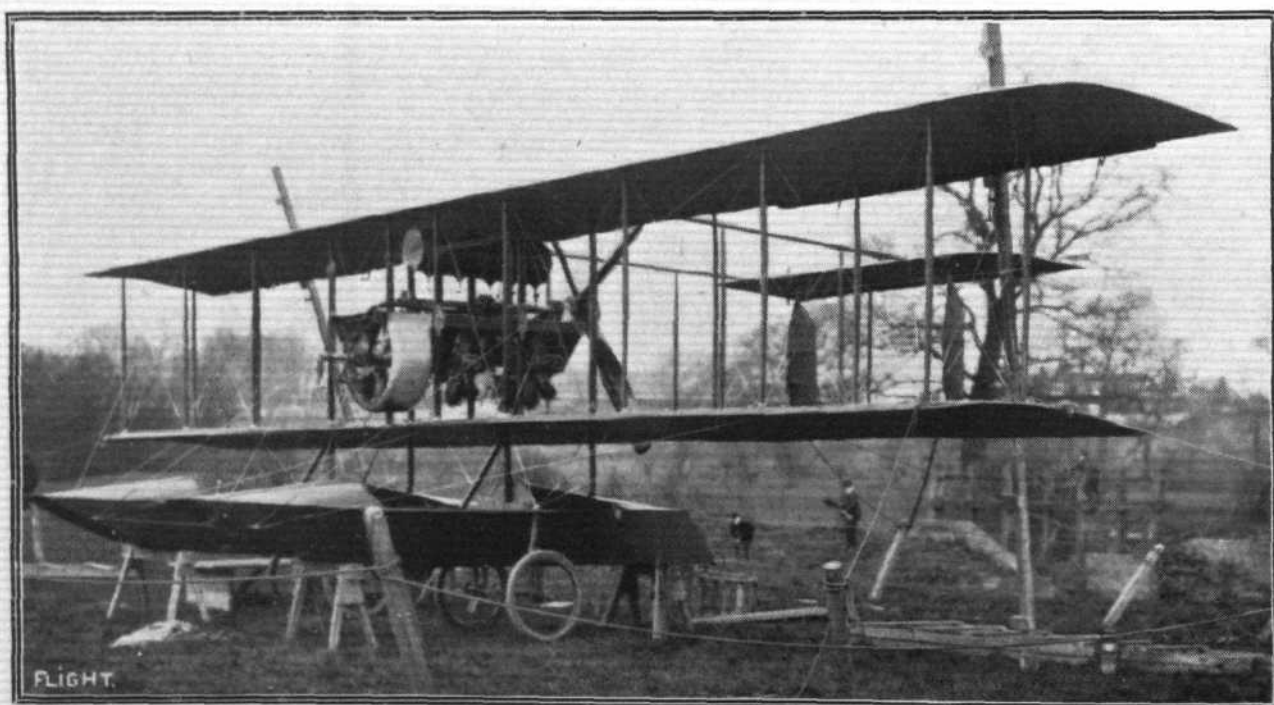
Side view of the Radley-England -waterplane.

"Flight" Copyright.

the former as a practical pilot, and the latter, not only as a pilot, but as a designer of successful machines.

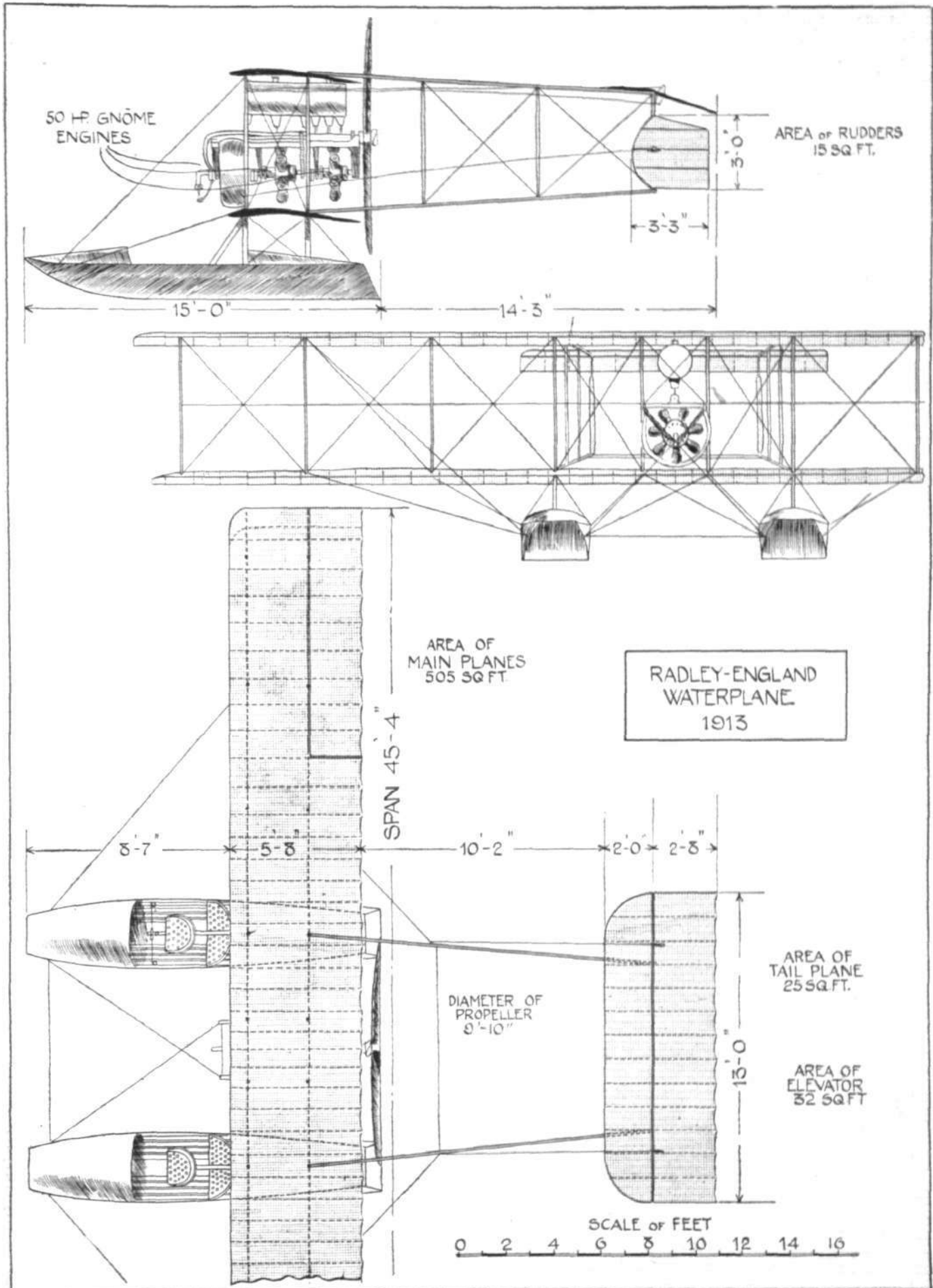
, In their joint effort they have made a bold attempt to advance aeroplane construction a definite step by building a machine which is designed in the first instance to carry six passengers. Other machines have carried as many passengers or even more upon occasion, but this is a

The machine is a waterplane, and the pilot and five passengers are seated, three in each of the two boat-like floats upon which the machine rests when it alights on the water. In the right-hand float is the accommodation for the pilot, and two seats for passengers are arranged behind him, while the three other passengers occupy corresponding seats in the other float.



Three-quarter front view of the RadleyEngland waterplane.

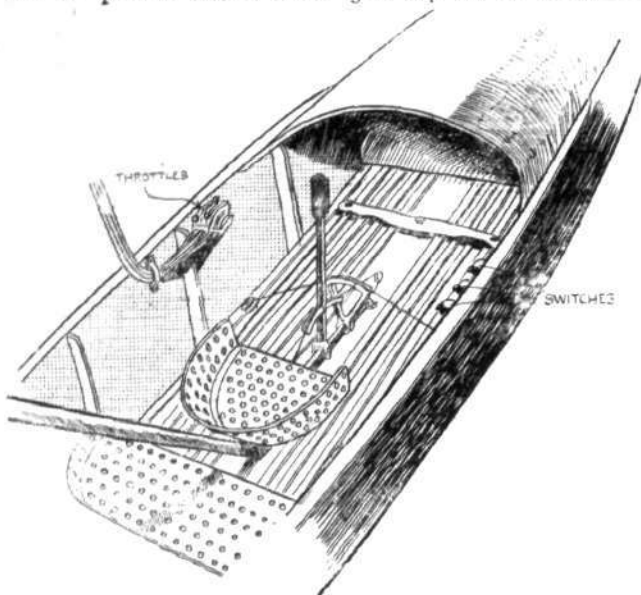
"Flight" Copyright.



THE RADLEY-ENGLAND WATERPLANE.—Plan, side and front elevation to scale.

"Flight" Copyright.

As may be judged from the fact that it has to carry this amount of weight, this biplane is by no means small, and its planes afford some 500 sq. ft. of supporting

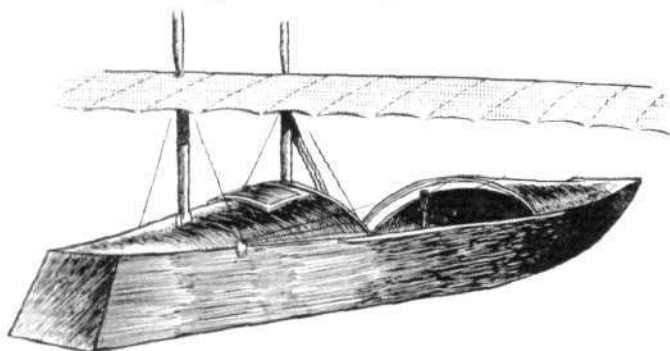


"Flight" Copyright.

Diagrammatic sketch of the pilot's and passengers' seats in one of the floats of the Radley-England waterplane.

surface. The weight empty is estimated at about 1,400 lbs., and the calculations for the weight loaded were based on the assumption that the normal wing loading would be in the order of $3\frac{1}{2}$ lbs. to the square foot. Actual weights generally differ considerably from estimated weights, and we should expect the final real value to come out somewhat heavier than the above-mentioned figure.

The tail is carried by outriggers in the usual manner, but is somewhat interesting in the comparatively small size of the fixed tail plane as compared with that of the



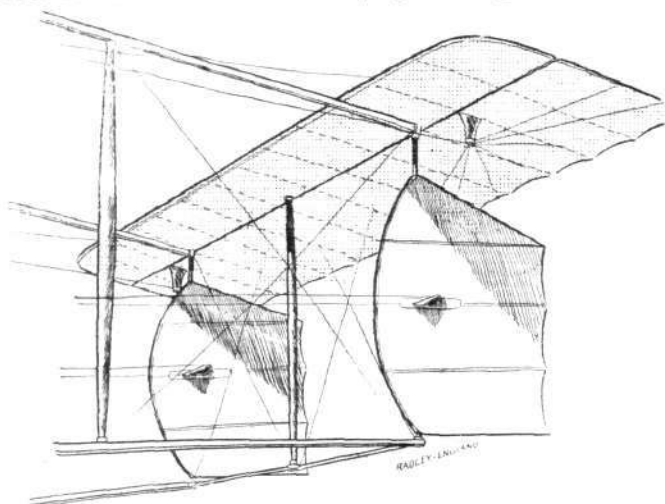
"Flight" Copyright.

Three-quarter rear view of the Radley-England float.

elevator flap serving as its extension, which would probably tend to increase the sensitiveness of the vertical directional control. Steering in a horizontal direction is carried out in the orthodox manner by means of two balanced rudders, carried by the outriggers and situated under the tail plane. Lateral balance is obtained by means of ailerons of large proportions hinged from the rear spars of the upper main planes. These various steering surfaces are operated by a control of the usual type, consisting of a universally-jointed lever, a backward and forward movement of which operates the elevator, and a side-to-side movement actuates the ailerons, which, by the way, are interconnected, so that when one is depressed the other is correspondingly elevated. The

rudders are controlled by a footbar in the usual manner, the bar, however, being practically unbreakable, as it is built up of some twelve laminations of wood.

As will be seen from the accompanying diagram of the wing section of the main planes, these have a somewhat small camber, 2 ins. maximum, and have a maximum thickness of $2\frac{1}{4}$ ins. The angle of incidence is set at 3 degrees. The main spars, which are of "I" section ash, are situated some eight inches from the leading edge, while the rear spars, which are also of "I" section ash, are spaced only $31\frac{1}{2}$ ins. from the main spars, roughly, half-way between the latter and the trailing edge. The ribs, which are spaced close together at the inner portion of the wings, are built up of spruce with willow web-blocks, or distance pieces. Mahogany is used for the inner struts carrying the engine, while the



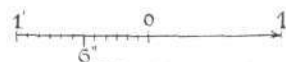
"Flight" Copyright.

Tail planes of the 150-h.p. Radley-England waterplane.

others are of spruce, those carrying the outriggers being made hollow for the sake of lightness, and bound with fabric.

The floats, each of which is connected to the lower main planes by three ash struts, have mahogany sides and white pine bottoms, while the floor timbers are of oak. Each float is partly covered over with curved decks of teak, and each has two water-tight compartments, either of which is sufficient to keep the whole machine afloat. The shape of these floats can be seen from our illustrations, and it will also be noticed that they are not stepped in any way.

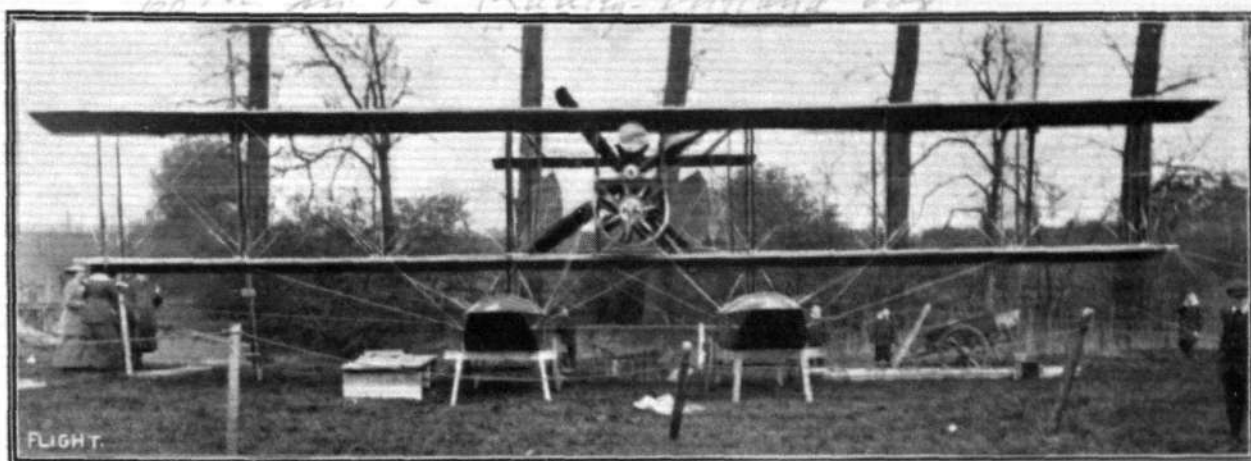
One of the most interesting features in the design of this machine is the manner in which the power plant is arranged. It consists of three 50-h.p. Gnome engines placed in line on a common axis and each supported on either side. Above the engines is a countershaft, which



"Flight" Copyright.

Wing section, to scale, of the Radley-England waterplane.

is driven by all three engines in common by means of triple Coventry chains of the roller type. The tubular countershaft is mounted on ball bearings, and is of very large diameter, and carries at its rearmost end a four-bladed propeller of about 9 ft. 10 ins. diameter, which is geared down to about three-fourths of the engine speed.



Front view of the Radley-England waterplane.

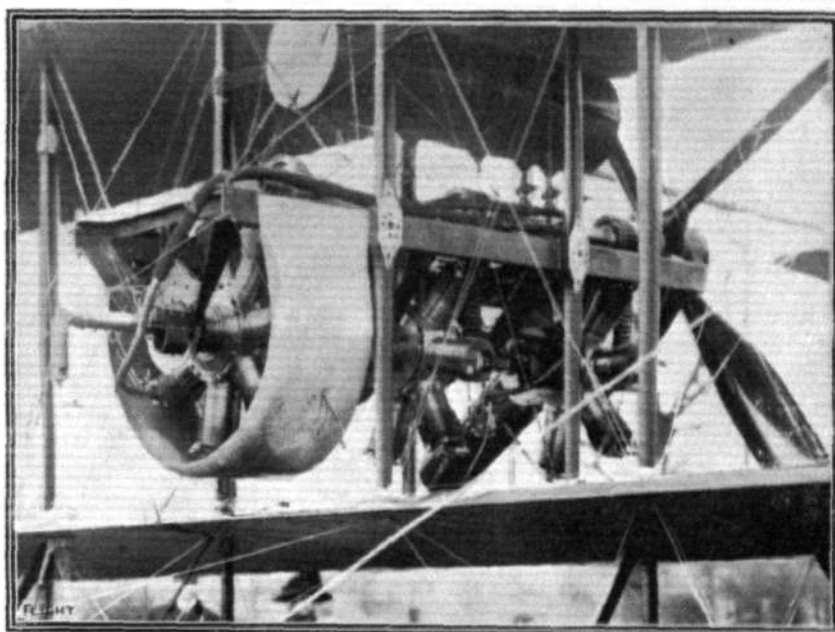
"Flight" Copyright

Interposed between the rear engine frame and the propeller is a large ball race which takes both the journal load and the thrust of the propeller. Another unusual feature of the drive is that the chain sprocket of each engine is machined solid with the end-plate of the crank case. Each engine is independently controlled from the pilot's seat by a separate petrol cock and switch, whilst on the control lever is a master switch that cuts out all three engines.

Fuel and oil are contained in tanks supported above the power plant, and each engine is supplied by separate pipes. At present the capacity of the fuel tank is 21 gallons, and the oil 10½ gallons, but it is intended to carry further supplies of fuel and oil in tanks in the floats. Oil is supplied to each engine by a separate pump.

Bracing is everywhere carried out in a thorough manner by stout steel wire, whilst double steel stranded-cables are employed for the control. Drift is also well provided against by means of wires attached to the bows of the floats. The wheels shown, attached to the floats, in our illustrations are only temporary, being fitted for preliminary trials on the ground before taking to the water. It is with this machine that Messrs.

Radley and England propose to enter for the latest prizes offered by the *Daily Mail*.



The power plant, consisting of three 50-h.p. Gnom engines, on the Radley-England waterplane.

"Flight" Copyright.

AIRSHIP NEWS.

The German Airship Manœuvres.

THE airship manœuvres at Cologne actually commenced on the 31st ult., when the Z2 made a trip of 5½ hours over Dusseldorf, Neuss, Essen, &c., while the P2, starting half an hour later, cruised for 2½ hours in the same direction. Voyages of short duration were made in the same direction on the two following days.

Long Voyage by "Hansa."

THE Zeppelin liner "Hansa" made a cruise of six hours' duration on the 4th inst., the altitude generally being kept about 1,500 metres.

Fleurus Makes a Long Voyage.

WITH nine persons on board the French army dirigible, Fleurus, cruised from Paris to Verdun on the 2nd inst. in 4 hrs. 25 mins.

High Work with New Astra.

ALTITUDE tests were made with the new Astra dirigible, built for the Russian Government, on the 2nd inst., and with ten persons in the car the dirigible went up to between 1,600 and 1,800 metres.

Night Work with French Airship.

SOME interesting work was carried out with the French military dirigible "Adjutant Vincenot" at Toul on the evening of the 2nd inst. and the early morning of the 3rd inst. The airship cruised at a height of 1,000 metres and the searchlights had no difficulty in locating the airship.

The Zeppelin in France.

THE incident, unfortunate from the German point of view, but more or less fortunate from the French side, of the drifting across the frontier of the latest Zeppelin Z4, has resulted in a great deal more attention being given to it than the *contre-temps* really warranted. Although there are one or two minor details in the design of these air craft which are not generally known, the major points in the design are, of course, well known. As to the actual facts of the incident, it appears that the airship started from Friedrichshafen at 6 a.m. on the 3rd inst., with a party of German officers on board, on a trial run to Baden-Baden. Trouble with the propellers, however, rendered it impossible for the airship to wage an effective struggle with the wind, and the pilots appear to have lost their bearings. Finding they were over French territory, they landed at the first convenient spot, which happened to be the manœuvre ground at Luneville, where a cavalry brigade was on parade. A French Court of Inquiry was held on the following day, and, coming to the conclusion that the dirigible was a private vessel belonging to the Zeppelin Co., its release was ordered. The military officers returned to Germany by train. After the re-inflation of the balloons, for which purpose 200 tubes of hydrogen were obtained from Strasburg, the airship ascended, and, crossing the frontier near Vic, arrived safely at Metz.

Subsequently the German Government communicated its thanks to the French Ambassador for the courteous manner in which the matter had been dealt with by the authorities in France.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

AVIATION COMPETITIONS.

The attention of intending Competitors is drawn to the following Aviation Prizes. Entry Forms and any further details can be obtained on application to the Royal Aero Club.

The Mortimer Singer £500 Prize.

(Under the Competition Rules of the Royal Aero Club.)

Mr. A. Mortimer Singer has presented to the Royal Aero Club a sum of £500 for an aviation competition on British machines flown by British subjects.

The following are the rules governing the competition:—

1. Both the entrant and pilot must be British subjects.
2. The complete machine, and all its parts, must have been entirely constructed within the British Empire, but this provision shall not be held to apply to raw material.
3. The prize shall go to the entrant.
4. The competition shall be in the first instance open from May 1st until October 31st, 1913, both dates inclusive.
5. The winner shall be the entrant of the aeroplane which shall first accomplish the following series of flights, on a course from a point on the land to a point out at sea not less than five miles distant in a direct line, but the latter point shall not be less than one mile from any shore.

The competitor shall make six out and home flights between the two points, alighting on arrival at each point, coming to rest and remaining until the observer gives the signal to re-ascend.

6. An altitude of at least 750 ft. must be attained on each journey from point to point, and on one occasion during the test an altitude of 1,500 ft. must be reached.

7. A passenger must be carried throughout the flights, and the combined weight of competitor and passenger must be not less than 264 lbs., any deficiency in weight being made up by means of ballast. Pilots or (and) passengers may be changed during the test.

8. Any landing contrivance may be used, but it must form part of the design of the aeroplane and not be merely a temporary or makeshift addition.

9. All oil, fuel and spare parts required must have been carried on the aeroplane from the start of the test.

10. The pilot and passenger will not be permitted to avail themselves of any other person's assistance either for starting, repairs, or other purpose throughout the test.

11. The total duration of the series of flights shall not exceed five hours; and shall take place between sunrise and sunset.

12. Competitors may select their own course, which must be approved by the Royal Aero Club before any flights are made, in this competition.

13. The flights must be observed at each point by the officials appointed by the Royal Aero Club.

14. Entries must be made in writing to the Royal Aero Club seven days prior to any attempt being made, and must be accompanied by a fee of £10, half of which will be refunded to the competitor should the Royal Aero Club decide that a genuine attempt has been made. A competitor must further deposit a sum of £10 on account of expenses which may be incurred by the Club. Any balance not so expended will be refunded.

The entrant must provide suitable accommodation for the observer, and if necessary a mark at the sea point.

15. Should any questions arise at any time after the date of entry, as to whether a competitor has properly fulfilled the above conditions, or should any other question arise in relation to them, the decision of the Royal Aero Club shall be final and without appeal.

16. A competitor by entering, waives any right of action against the Royal Aero Club or Mr. A. Mortimer Singer for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or Mr. A. Mortimer Singer, or their representatives or servants, or any fellow competitor.

17. The aeroplane shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or his aeroplane, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and Mr. A. Mortimer Singer in respect thereof.

18. The Royal Aero Club reserves to itself the right to add, to amend, or to omit any of these rules should it think fit.

The British Empire Michelin Cup No. 1.

(Under the Competition Rules of the Royal Aero Club.)

The Michelin Tyre Company has presented to the Royal Aero Club of the United Kingdom, for competition by British aviators, a trophy of the total value of £500.

Annually, for five years, a replica of this trophy, together with a sum of £500 in cash, will be given to the successful competitor. This trophy will be competed for under the following conditions:—

CONDITIONS.

1. The winner for the year 1913 shall be the competitor who shall have accomplished the longest distance on an aeroplane in flight round the course, Brooklands, Hendon, Farnborough, on any one of the following dates:—

Saturday	... April 5th	Saturday	... July 5th
Thursday	... " 17th	Thursday	... " 17th
Saturday	... May 3rd	Saturday	... August 2nd
Thursday	... " 15th	Thursday	... " 14th
Saturday	... June 7th	Saturday	... September 6th
Thursday	... " 19th	Thursday	... " 18th

If, in the opinion of the Club, bad weather has prevented the competition being held on any of the above fixed dates, the Club may add other dates instead.

2. Flights shall be made between 7 a.m. and one hour after sunset.

3. No replenishments of oil, fuel, etc., will be permitted.

4. No repairs may be carried out after a start has been made.

5. Competitors shall make periodical compulsory stops of not less than five minutes, with engine stopped, on completing an entire circuit of the course plus one section, e.g., starting from Brooklands the competitor would pass Hendon, Farnborough, Brooklands, and alight at Hendon. His next flight would be from Hendon, passing Farnborough, Brooklands, Hendon and alighting at Farnborough, and so on.

6. Landing at any point other than a proper landing place terminates a flight, and the competitor will then be credited with the mileage of the sections which he has completed, in conformity with the regulations.

7. A minimum distance of 300 miles must be accomplished.

8. Starts may be made from any of the three points of the course.

9. The entrant, who must be the person operating the machine, must be a British subject, flying on a British-made aeroplane, must hold an Aviator's Certificate, and must be duly entered on the Competitors' Register of the Royal Aero Club.

10. The complete machine, and all its parts, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material.

11. An entrance fee of £1 must accompany every notification of an attempt, and at least three clear days' notice must be given to the Secretary, Royal Aero Club, 166, Piccadilly, London, W. A competitor must further deposit a sum of £10 on account of expenses, if any, of officials. Any balance not so expended will be returned to the competitor.

12. Should any questions arise at any time after the date of entry as to whether a competitor has properly fulfilled the above conditions, or should any other question arise in relation to them, the decision of the Royal Aero Club shall be final and without appeal.

13. A competitor by entering waives any right of action against the Royal Aero Club or the Michelin Tyre Co. for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Michelin Tyre Co., or their representatives or servants, or any fellow competitor.

14. The aeroplane shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or his aeroplane, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Michelin Tyre Co. in respect thereof.

15. The Royal Aero Club reserves to itself the right to add to, amend, or omit any of these rules should it think fit.

The British Empire Michelin Cup No. 2, £800.

(Under the Competition Rules of the Royal Aero Club.)

The Michelin Tyre Company has presented to the Royal Aero Club of the United Kingdom for competition by British aviators, the sum of £800, to which will be added a trophy to be retained by the winner.

The following are the rules governing the competition for the year 1913:—

1. The winner for the year 1913 shall be the competitor who, on October 15th, 1913, shall have completed a prescribed circuit of about 279 miles on an aeroplane in flight in the fastest time, reckoned in miles per hour.

2. Competitors may select their own circuit of about 279 miles, but the start must be made from a flying ground approved by the Royal Aero Club, and the proposed circuit must be submitted to the Royal Aero Club before the flight is made.

The complete circuit must be accomplished without alighting.

3. The flight must be observed at each point named in the circuit by officials appointed by the Royal Aero Club.

4. A number must be prominently displayed on the aeroplane in places approved by the officials, and when flying round each of the points selected in the circuit, the aviator must fly sufficiently low so that his number may be easily verified by the official observer.

5. The circuit must be completed between the hours of sunrise and sunset, on any one day.

6. The entrant, who must be the person operating the machine, must be a British subject, flying on a British-made aeroplane, must hold an Aviator's Certificate, and must be duly entered on the Competitor's Register of the Royal Aero Club.

7. The complete machine, and all its parts, must have been entirely constructed within the confines of the British Empire, but this provision shall not be held to apply to raw material.

8. An entrance fee of £1 must accompany every notification of an attempt, and at least three clear days' notice must be given to the Secretary, Royal Aero Club, 166, Piccadilly, London, W. A competitor must further deposit a sum of £10 on account of expenses, if any, of observers. Any balance not so expended will be returned to the competitor.

9. Should any questions arise at any time after the date of entry as to whether a competitor has properly fulfilled the above conditions, or should any other question arise in relation to them, the decision of the Royal Aero Club shall be final and without appeal.

10. A competitor by entering waives any right of action against the Royal Aero Club or the Michelin Tyre Co. for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Michelin Tyre Co., or their representatives or servants, or any fellow competitor.

11. The aeroplane shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself or his aeroplane, or his employees or workmen, and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Michelin Tyre Co. in respect thereof.

12. The Royal Aero Club reserves itself the right to add to, amend, or omit any of these rules should it think fit.

HAROLD E. PERRIN, Secretary.

166, Piccadilly.

April 12th, 1913.

UPSIDE DOWN IN MID AIR.

TWO REMARKABLE EXPERIENCES.

THE extraordinary experience that befell Capt. H. R. P. Reynolds of the Royal Flying Corps some time ago, when he was turned upside down in mid air, has recently happened to Capt. Aubry of the French Army. Capt. Aubry was flying a Deperdussin monoplane fitted with a 60-h.p. Clerget engine from Rheims to Longwy. He stopped at Longwy in order to make various flights, and on one occasion was flying in a wind of about 40 m.p.h. A gust struck his machine, and, according to the accounts, the pilot was thrown against his control in such a way as to promote a dive. A second gust turned the machine completely upside down, and for a distance of some 200 yards the monoplane glided with its wheels in the air. This feature of the accident, according to the reports, has been certified by responsible military witnesses. Having lost speed during its upside down glide, the machine made another dive, and thereby regained its proper attitude. Capt. Aubry was not thrown out during these alarming manœuvres, nor did he lose his presence of mind, for when the machine did once more come under control, he observed that the landing ground towards which he was descending was none too suitable, and thereupon switched on his engine, and flew off to a place nearly two miles distant.

This is not the first time a machine has been upside down in the air and escaped. The late Capt. Hamilton, it will be remembered, was turned upside down during his visit to Central America. The accident in his case happened at a low altitude, and the monoplane landed on its head. The *cabane* saved the pilot from injury.

Capt. Reynolds, who, so far as we know, was the first to experience this sort of accident and to live to tell the tale, very kindly gave us his own description of what exactly took place:—

"I started from Oxford on the morning of August 19th, 1911, and flew along the line towards Cambridge, where I encountered a misty atmosphere and thought it well to descend. I came down close to Launton station. That evening, soon after 7 o'clock, I started again. It was warm and fine, but rather suggestive of thunder; the air was perfectly still. I scarcely had occasion to move the control lever at all until I got to Bletchley, where it began to get rather bumpy. At first, I thought nothing of this; but suddenly it got much worse, and I came to the conclusion it was time to descend. A big

black thunder-cloud was coming up on my right front; it did not look reassuring, and there was good landing ground below. At this time I was flying about 1,700 feet altitude by my aneroid, which had been set at Oxford in the morning. I began a glide, but, almost directly I had switched off, the tail of the machine was suddenly wrenched upwards as if it had been hit from below, and I saw the elevator go down perpendicularly below me. I was not strapped in, and I suppose I caught hold of the uprights at my side, for the next thing I realised was that I was lying in a heap on what ordinarily is the under surface of the top plane. The machine in fact was upside down. I stood up, held on and waited. The machine just floated about, gliding from side to side like a piece of paper falling. Then it over-swung itself, so to speak, and went down more or less vertically sideways until it righted itself momentarily the right way up.

"Then it went down tail first, turned over upside down again, and restarted the old floating motion. We were still some way from the ground, and took what seemed like a long time in reaching it. I looked round somewhat hurriedly, the tail was still there, and I could see nothing wrong. As we got close to the ground the machine was doing long swings from side to side, and I made up my mind that the only thing to do was to try and jump clear of the wreckage before the crash. In the last swing we slid down, I think, about thirty feet, and hit the ground pretty hard. Fortunately I hung on practically to the end, and, according to those who were looking on, I did not jump till about ten feet from the ground. Something hit me on the head and scratched it very slightly, but what it was I did not know, for I was in too much of a hurry to get away from the machine to enquire at that time.

"The next morning I went out to it, and found one of the rods which held up the left extension lying between the engine and the right wing tip. The propeller was undamaged, the elevator and the tail were practically unhurt, while the undercarriage, being uppermost, was untouched. The machine on which this happened was an ordinary Bristol biplane with a 50-h.p. Gnome.

"I was told that just before I smashed there had been two or three 'whirlwinds,' as the people called them, in Bletchley, and that one of these had stripped the leaves off a tree. Very possibly this was my friend."

FROM THE BRITISH FLYING GROUNDS.

Brooklands Aerodrome.

Bristol School.—On Monday, last week, Merriam was up very early for a couple of solos before pupils arrived, later up behind Mr. Landon for landing practice, and then giving pupil instruction in banking and right and left hand turns. This pupil was then up alone for the first time and made good straights. Lieut. Morgan was out for a good solo, making several circuits with a couple of good landings.

Flying was resumed after breakfast. Merriam first made test. Mr. Landon out for straights and half turns. Merriam took this pupil for instruction, after which he ascended alone, and made some very fine turns, also landing well.

In the afternoon Merriam was up first for solo, and then as passenger to Lieut. Peirse on straights, while Lieut. Morgan made several excellent circuits. Bendall went as passenger behind Lieut. Peirse, Merriam ascending with the same pupil. Lieut. Peirse then went alone, and carried out a good first time solo. Lieut. MacClellan made several straights with Bendall behind him. Good show put up by Mr. Landon who carried out several good circuits with right hand turns, and good figures of eight; this pupil is fully competent for his certificate tests. Solo by Merriam and Bendall to wind up day's work.

Bendall made an early test on Tuesday, but heavy wind prevented school work. Another test was made by him in the afternoon, but the conditions were not favourable.

Very early Bendall tested two machines on Wednesday, after which Lieut. Peirse was out for straights, and Lieut. Morgan for circuits. Bendall went up as passenger with Lieut. MacClellan for straights and landing practice. Lieut. Peirse again up for straights and left hand turns. Lieut. Morgan circuits, and Mr. Landon figures of eight, this pupil later completing several good circuits. Bendall sat in the passenger's seat behind Lieut. MacClellan for landing practice. Wind was far too bad for outdoor work in the afternoon.

On Tuesday, after the usual trial, Bendall took Lieut. Logan (a recent Bristol recruit) for his first flight. Lieut. Peirse on another machine made several good straight flights, while Mr. Landon went for a good solo. Lieut. Duncan was away for landing practice (Bendall sitting behind), Lieut. Morgan going out again for straights. Bendall wound up the morning's work by taking Lieut. Broder for a flight.

Wind was far too strong in the afternoon for flying.

Wind and rain prevailed all day on Friday, and flying was impossible.

On Saturday weather still very bad; work continued in the hangars.

On Monday last week, Lieuts. Joubert, Fox, and Boger flew in from Farnborough on army machines B.E. 206 and 272, returning thence after a short stay.

Mr. W. L. Brock, came over Saturday from Hendon on a Dep. monoplane, 35-h.p. Anzani engine, but the wind was too strong to permit of his return.

On Sunday Mr. Hamel had to disappoint his Brooklands friends for the first time, owing to the gale of wind blowing up to fifty miles an hour. He turned out at Hendon for a trial flight preparatory to visiting Brooklands, but the wind buffeted him about so much that he had most reluctantly to telephone that it was impossible for him to make the journey.

So great is the increase in the instructional work carried on by the Vickers School where Mr. Barnwell is in charge, that the number of machines available for pupils will shortly be increased by the addition of a monoplane and a biplane, and also a fast all-weather monoplane. Mr. Barnwell has been a most consistent flyer all the year round in all conditions of weather, which shows the wonderful stability of the Vickers machines, but it is anticipated that with the arrival of the all-weather monoplane he will be an even more constant flyer than hitherto.

The sympathies of his many friends in aviation circles will be extended to Mr. Howard Flanders, who is now lying in Walton Cottage Hospital, as the result of being attacked by a dog, which had previously bitten several other people, whilst riding his motor cycle in Oatlands Drive, Walton, on the 31st March. Although Mr. Flanders is making good progress, the nature of his injuries, fracture of the base of the skull, will necessitate a rest of some months' duration.

Vickers School.—Early Monday morning, last week, Knight on biplane, then Barnwell on biplane with Mr. Wight, a new pupil. Barnwell circuits on No. 3 mono., giving place to Lieut. Blatherwick, R.N., who did some very good straights. Knight then went out on biplane with Mr. Wight. In the afternoon Mr. Knight straights on No. 3, showing great improvement. Mr. Barnwell on biplane with Mr. Wight, the latter promoted to front seat in his first day's practice, and getting on remarkably quickly; Knight doing further straights with Mr. Wight piloting.

Mr. Barnwell out Tuesday on No. 5 mono. in the afternoon till rain began.

Wednesday, Barnwell out on biplane early. After test flight by Knight, Lieut. Blatherwick, on No. 3 mono., doing very good straights. Mr. Knight, also on No. 3, making good progress. Knight and Lieut. Blatherwick on biplane. Wind stopped flying after breakfast.

Thursday, Barnwell out on biplane solo, then with prospective pupil, then with Lieut. Blatherwick. A. Knight solo. Wind stopped flying at about 8 a.m. for rest of day.

London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—Monday, last week, Mr. Bayetto out from early morning on B2 machine, making circuits terminating in good landings. Later in the afternoon, Mr. Bayetto continually practising, with the intention of taking his *brevet* at an early date. Mr. Bayetto again out Tuesday on B2, but not until about five o'clock. Next day Mr. Lan Davis out on B4, Mr. Major, a new pupil, on No. 7 biplane doing straights with instructor in passenger seat. Later, Mr. Lan Davis out on B2 monoplane.

Mr. R. H. Carr out at 6.40 a.m., Thursday, doing straights on No. 7 biplane. The wind blowing at over ten miles an hour prevented other pupils from taking practice. Mr. Carr showed very steady progress.

Too windy, Friday, for pupils to fly, and again Saturday too windy for pupils, the wind registering 45 miles per hour on wind gauge.

Blériot School.—Monday morning, last week was excellent for pupils, and after Mr. Seymour Nutford had done a couple of circuits on No. 3, just repaired, Lieut. Loftus Bryan and M. Desoutter and Clappen were sent up in turn to do circuits and figure 8's. Each did very well indeed, and are all practically ready for their tickets. M. Desoutter made a quite nice *vol plané*, landing from 60 ft., and Lieut. Loftus Bryan did two excellent 8's.

Captain G. Cox was meanwhile doing rolling practice on No. 1 and is making excellent progress. Mr. Williams was also out doing similarly on No. 2.

The following day Lieut. Loftus Bryan and M. Desoutter were the only pupils enabled to do any flying, and rain early put a stop to their practice, each having only time for one circuit on No. 3. The remaining days of the week were too windy for any school work to be done.

On Saturday, Mr. Gustav Hamel was flying with Miss Trehawke Davies in a strong and gusty wind and giving an excellent exhibition on her 70-h.p. tandem, getting up to about 3,500 ft.

British Deperdussin School.—School started at 7 a.m. Monday last week, being too foggy before. Mr. Bauman 30 mins. rolling and hopping on No. 2. Lieut. Bourke 40 mins. rolling and hopping on same machine. This was Lieut. Bourke's first lesson after a long leave of absence. Mr. Barron had his first lesson on No. 2 for 20 mins. He is doing fairly well, but hasn't quite got into the idea of steering with his feet. This completed the morning's work. In the afternoon, the above three pupils each had 5 mins. on No. 2, but fog came up and stopped work.

School started at 6 a.m. Tuesday. Lieut. Bourke 7 mins. rolling and hopping on No. 2. Mr. Bauman on same machine for 7 mins. Mr. Barron 5 mins. on No. 2, rolling, he got into rough ground and broke chassis strut. Weather unsuitable for the rest of the day. Mr. Brock made two test flights on No. 5—the 35-h.p. racer, testing the engine.

Wednesday.—School work started at 6 a.m., Lieut. Bourke 25 mins. grasshopping on No. 2, Mr. Bauman 15 mins. on the same machine. Both of these pupils are now ready for promotion. Mr. Barron, who is improving slowly, 10 mins. on No. 2, rolling. In the afternoon, Mr. Brock made a splendid flight on No. 5 in a stiff breeze. This machine flies very well, with plenty of climbing power.

Lieut. Bourke 5 mins. on No. 2 at 6 a.m. Thursday, but struck a small donga and broke patten of chassis. At 9.30 Mr. Brock was out on No. 5, taking her up to 2,000 ft. in a 20 m.p.h. wind. He was up for 25 mins., and finished with a right and left spiral *vol plané*. In the afternoon, Mr. Brock was out on the racer, and gave one of the finest exhibition flights ever seen on a 35-h.p. 'bus. He reached an altitude of 2,350 ft., finishing with a fine glide. The flight lasted about 30 mins. There was a 40 m.p.h. wind blowing at the time.

Too windy for school work Saturday. In the afternoon Mr. Brock took out No. 5 in a 45 m.p.h. wind, rose to about 2,000 ft., and then started for Brooklands, where he landed 17 mins. after leaving the Hendon aerodrome. The whole performance was a very fine one.

W. H. Ewen School.—Notwithstanding unfavourable weather a considerable amount of school work and exhibition flying was done on the Caudron machine last week. On Tuesday, the 1st April, the pupils were out at 6.10 a.m., when M. Baumann, after a

test flight on the 35-h.p. *brevet* Caudron, handed the machine over to Messrs. Torr and Stewart, who made several excellent straight and half-circuits. Rain coming on put a stop to further practice. After lunch the wind being too high for school work, Mr. L. W. F. Turner put up a good exhibition on the 60-h.p. Caudron, and later gave several of the pupils passenger flights for air experience. Later, Mr. Turner was out doing several circuits on the 35-h.p. Caudron.

During the afternoon Mr. Traver, after testing the 70-h.p. Caudron biplane, flew the machine straight off to Eastchurch, doing the journey well under the hour. On Wednesday, the pupils were out at 5.30 a.m., under the instruction of L. W. F. Turner and M. Baumann. Mr. L. W. F. Turner after a test flight on the *brevet* Caudron, handed the machine over to Messrs. Torr, Zubiaga and Warren, who were all making splendid progress, in straight flights and half-circuits. M. Baumann was also getting good results from pupils on the 35-h.p. Caudron No. 2, Mr. Stewart doing good straight flights, while Lieut. G. Adams and Mr. Pendlebury were rolling on the same machine.

On Thursday pupils were out at 6 a.m., when Mr. Turner, after testing the *brevet* Caudron, handed the machine over to Mr. Torr, who made several excellent straight flights and half-circuits, while Mr. M. Zubiaga made a number of straight flights in good style. M. Baumann was also busy with pupils on the 35-h.p. Caudron No. 2, Lieut. G. Adams and F. W. Goodden getting in some useful practice in straight flights.

Temple School.—On Tuesday last week, under Mr. Temple's supervision, Mr. Vale was out rolling on Blériot No. 2. Mr. Lance was also making good progress. Mr. G. L. Temple came out on the Caudron, and flew in his usual good style, making excellent "switchbacks" and banked turns. Since then the pupils have been confined to constructional work in hangar, the weather being far too windy for flying practice.

Salisbury Plain.

Bristol School.—First thing on Monday, last week, fog very thick, flying being impossible. Later on conditions improved, and Pixton took Lieut. Bromet for biplane tuition. Lieut. Griffith meanwhile out on a single-seater monoplane, taxiing for 20 mins. Later on Pixton took Lieut. Bromet for a long cross-country flight, flying round Fargo, Shrewton and Knighton Down; for most of the time the pupil had charge of the hand control. Lieut. Read was out for a high solo, reaching 500 ft. in fine style. Lieut. Bromet was again out later with Pixton for a solo. Mrs. Grace, wife of Capt. Hamilton Grace, an old pupil, was taken for a "joy ride" by Pixton, who afterwards finished up the day's work by taking Lieut. Bromet for further instruction.

Too gusty and windy for tuition on Tuesday. On Wednesday, weather was still bad, and work confined to the new machines just received from Filton works. No improvement in the weather on Thursday, and yet another day was spent in the hangars.

Practically a gale blowing all day on Friday. Things busy in the hangars completing the erection of some of the new Bristol tractor biplanes.

Royal Flying Corps.—Wednesday of last week opened fine,



Mr. H. M. Brock on the Dep. off for a flight on Farnborough Common.

and Lieut. Cholmondeley made several flights on M. Farman 214, and afterwards Lieut. Stockford took over the machine for a short trip. Lieut. Cholmondeley then took charge again, and went up with Air-Mechanic Jenkins, being lost sight of in the clouds at a height of 2,000 ft. After several circles, they headed off towards Winchester, but, on reaching Greatly, came into contact with clouds and rain at a height of 3,000 ft., and so returned to hangars. Major Higgins was out several times on Farman 268, once taking up Lieut. Porter as passenger. This machine was also piloted by Lieut. Carmichael, who took Lieut. Stockford as passenger. Lieut. Chrysta and Lieut. Porter took turns in taking up B.E. 267.

Thursday morning was fair for outdoor work, and Lieut. Cholmondeley was out early on M. Farman 214, making one flight of 35 mins., rising very quickly to a height of 6,000 ft. Major Higgins was also out on Farman 268, once taking up Lieut. Carmichael as passenger. Lieut. Carmichael then took over the biplane, and after one or two solo flights, took up Lieut. Stockford. Lieut. Chrysta out on B.E. 267, made a useful flight, as also did Capt. Allen, who had Lieut. Chrysta as passenger. Lieut. Anderson made a 20-min. flight at a height of 2,000 ft. on 267. Capt. Reynolds, with Mr. Gould as passenger on M. Farman 270, and Mr. Atkinson, with Capt. Board as passenger on M. Farman 269, arrived from Farnborough, they having covered 50 miles in 55 mins. Capt. Reynolds, when at a height of 5,000 ft., with his engine shut off, made 15 right and left turns before landing later on. Capt. Fox arrived with a passenger from Farnborough, with B.E. biplane 272, having made a detour around Southampton on the way. Friday, Saturday, and Monday, owing to boisterous gales, work confined to hangars.

There was a welcome change on Tuesday morning, and several of the R.F.C. officers were out early. At 7.18 an accident occurred, but fortunately no one was seriously hurt. Lieut. Wadham, with Lieut. Porter as passenger, had made on B.E. biplane 267 a scouting trip round the Downs, and as they were landing Lieut. Carmichael, with Lieut. Allen as passenger, was starting on the H. Farman 268. The B.E. crashed on to the Farman, both machines being smashed. A mechanic who was standing by had a narrow escape, as he and the four officers were buried under the debris. Both machines were new ones, having only been in use a few weeks.



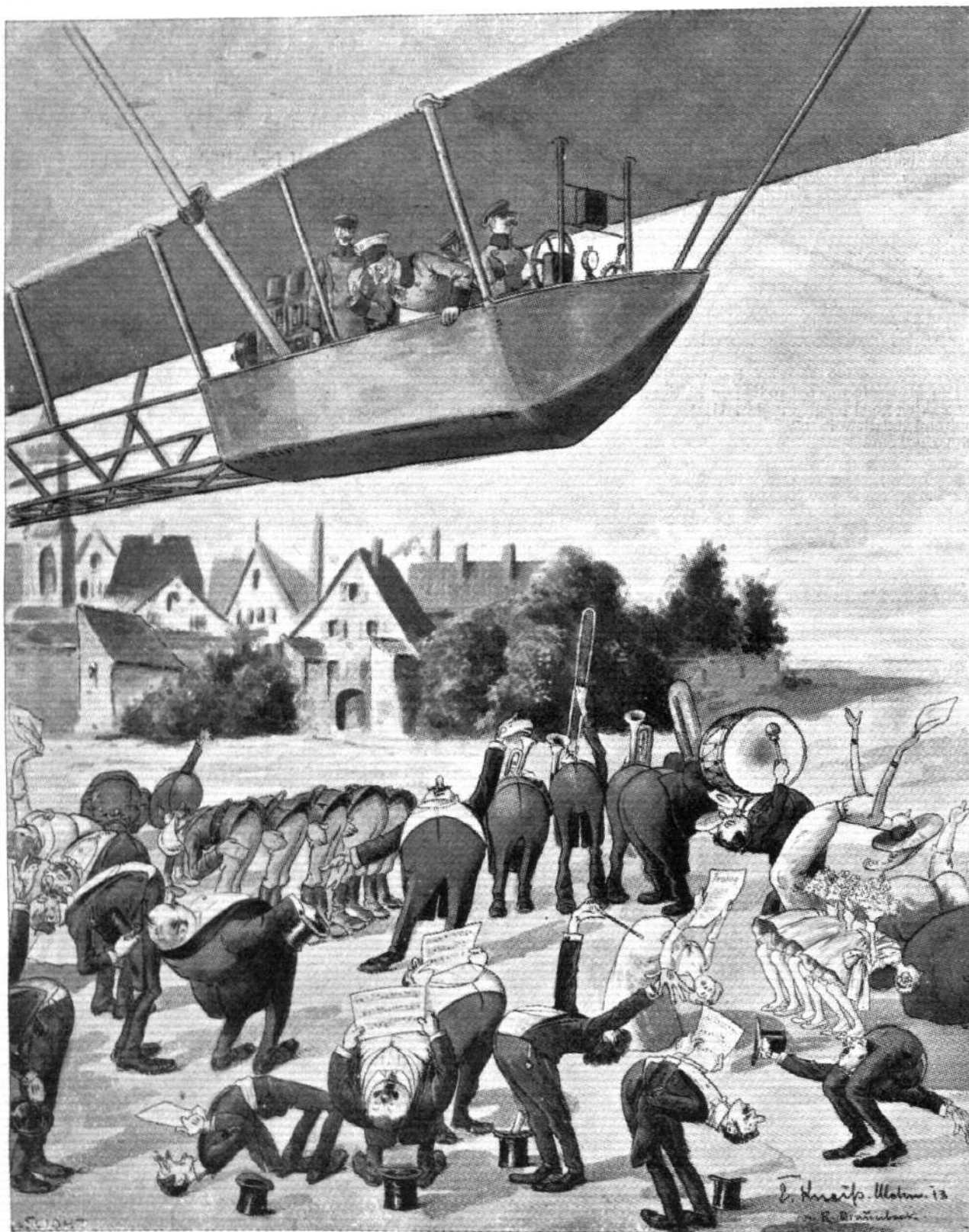
FLYING AT HENDON.

THE chart of the anemometer at the Hendon aerodrome last Saturday registered an ominous looking, jagged line above and below the 40-mile mark, which showed that the velocity of the wind was well in the neighbourhood of 50 m.p.h., and sometimes above. It was with some astonishment, therefore, that we observed the small 35-h.p. Anzani-Deperdussin monoplane brought out of its shed, and, after a short trial of the engine, taxied out on to the ground by H. M. Brock, the instructor of the Deperdussin School. It did not seem possible that any machine would be taken out with the wind as it was, let alone a small machine like the 35-h.p. "Dep." Nevertheless, at 3.45 p.m., this daring young pilot left the ground, head on to the wind, and rising for all the world as if it were a helicopter, he made his way very slowly across the ground, and then turned. With almost incredible speed he was carried outside the aerodrome, and all wondered how he could possibly get back. A hard struggle it was, too, for the little monoplane hardly seemed to make any headway at all at times, and hovered, like a hawk, for quite and appreciable time over the sheds, rising all the time. Little by little, and rocking from side to side, it made its way into and across the aerodrome, taking about 15 mins. to reach

the far end of the aerodrome from only just outside the latter. By this time pilot and machine were about 1,500 ft. up, and then, to everyone's surprise, Brock turned towards Brooklands and was out of sight before one realised it. It was announced later that he arrived at his destination, and made a safe landing at 4.23 p.m. In the meanwhile, Hamel and Miss Trehawke Davies came upon the scene with the latter's 70-h.p. Gnome-Blériot monoplane. At four o'clock they rose from the wooden platform landing on to the aerodrome, in a manner that reminded us very much of the "rise off the ground" competition for models held at Hendon some little time back. Even with the 70-h.p. Blériot, it was a hard fight when against the wind, whilst with it the speed was tremendous. Hamel and his passenger soon rose to well over 4,000 ft. high, and then it was that one witnessed a pretty and unusual sight. There were numerous clusters of fleecy clouds dotted about the clear blue sky, travelling at a great speed, and above these the Blériot, heading against the wind, would pass again and again. Once when over a rather large cloud Hamel turned, and suddenly reappeared directly opposite to where he was expected. After this game of hide-and-seek he made his way back to the

aerodrome, for he had in the meanwhile drifted outside. It took a long time to return, not so very much quicker than the little "Dep.," but when at last over the aerodrome he made a slight spiral descent, coming in over the trees by the Grahame-White shed, where he received a very nasty gust. A safe landing was effected, however, exactly half-an-hour after the start. Miss Davies expressed her-self delighted with the flight, but missed her usual series of spirals.

The wind was considerably stronger the next afternoon, Sunday, yet Gustav Hamel made two magnificent flights. On these occasions, however, he ascended on the single-seater, 50-h.p. Gnome-Blériot monoplane. Both flights, which each lasted for about 15 mins., were splendid exhibitions of airmanship. Louis Noel also made a very plucky attempt to ascend in the old Grahame-White 'bus, but found the wind much too strong, and wisely gave up the attempt.



UP-TO-DATE RECEPTIONS.—"His Serene Highness" makes a descent at his estate in his airship during the manœuvres.—(From the German *Motor*).

"PUT NOT YOUR TRUST IN DREADNOUGHTS."

IT is some few years now since we had the editorial pleasure of commenting on the fine imaginative work of Mr. H. G. Wells in respect to the future of flying. Indeed, it was prior to the foundation of this journal as a separate entity, when it was still a part of the *Auto*, that we last discussed his vivid pen pictures of the possible future war in the air. The articles that he has written these last few days in the *Daily Mail* naturally recall his novels, but it is not mere fiction this which Mr. Wells is now presenting to the public of England through such a widely-read channel. Imagination it may be, but it is an imagination of the kind that we need in these Isles.

"For some years there seems to have been a complete arrest of the British imagination in naval and military matters. That declining faculty, never a very active or well-exercised one, staggered up to the conception of a Dreadnought and seems now to have sat down for good. Its reply to every demand upon it has been 'more Dreadnoughts.' The future as we British seem to see it is an avenue of Dreadnoughts and Super-Dreadnoughts and Super-Super-Dreadnoughts, getting bigger and bigger in a kind of inverted perspective. But the ascendancy of fleets of great battle-ships in naval warfare, like the phase of huge conscript armies upon land, draws to its close. The progress of invention makes both the big ship and the army crowd more and more vulnerable and less and less effective. A new phase of warfare opens beyond the vista of our current programmes. Smaller, more numerous and various and mobile weapons and craft and contrivances, manned by daring and highly skilled men must ultimately take the place of those massivenesses. We are entering upon a period in which the invention of methods and material for war is likely to be more rapid and various than it has ever been before, and the question of what we have been doing behind the splendid line of our Dreadnoughts to meet the demands of this new phase is one of supreme importance. Knowing, as I do, the tremendous imaginative indolence of my countrymen, it is a question I face with something very near to dismay.

"But it is one that has to be faced."

In order to find force to his argument Mr. Wells is perhaps somewhat inclined to override intermediate stages in progressive development. We scarcely agree with his dictum "Put not your trust in Dreadnoughts," but if he will allow us to add the word "alone" to the end of his text, then certainly we are quite at one with him.

Nothing is more apparent to imaginative thinkers who have allowed their minds to dwell upon the real significance of aerial navigation than that Great Britain must keep abreast of other powers in the matter of aerial armament. We do not suppose for a moment that the aeroplane or the dirigible in their present state have rendered obsolete the fighting ship that sails the sea, but we do agree that as accessories to the effective use of those water-borne machines, the aeroplane and the airship are as essential as the submarine, or the torpedo boat.

"This country most of all, which was left so far behind in the production of submarines, airships and aeroplanes, must be made to realise the folly of its trust in established things. Each new thing we take up more belatedly and reluctantly than its predecessor. The time is not far distant when we shall be 'caught' lagging unless we change all this.

"We need a new arm to our service; we need it urgently, and we shall need it more and more, and that arm is Research. We need to place inquiry and experiment upon a new footing altogether, to enlist for them and organise them, to secure the pick of our young chemists and physicists and engineers, and to get them to work systematically upon the anticipation and preparation of our future war equipment. We need a service of invention to recover our lost lead in these matters.

"And it is because I feel so keenly the want of such a service, and the want of great sums of money for it, that I deplore the disposition to waste millions upon the hasty creation of a universal service army and upon excessive Dreadnoughting. I am convinced that we are spending upon the things of yesterday the money that is sorely needed for the things of to-morrow.

"With our eyes averted obstinately from the future we are backing towards disaster."

Mr. Wells is quite right in his analysis of certain phases of the British character. As a nation we are obsessed with the sense of being past middle age. We have lost our interest in toys and we are apt so to regard new things that are neither quite perfect in themselves nor thoroughly understood. We have a fondness for "established things" and sing our part in the grand concert of the Powers with dignified mien and mellow voice. What we lack most is the inability to unbend in the bosoms of our own homes, to encourage the more youthful players with real enthusiasm in the evolution of a new idea—which one day will in its turn have become an established thing.

The great value of Mr. Wells' articles is that they are constructive as well as critical. He does not content himself with pulling down the existing edifice, poor as it is, but offers cogent and sensible ideas for the new building to be erected on its ruins. In the last article of the series he points out that—

"We are buying enormous quantities of stuff that will be old iron in twenty years' time, and we are starving ourselves of that which cannot be bought or made in a hurry and upon which the strength of nations ultimately rests altogether; we are failing to get and maintain a sufficiency of highly educated and developed men inspired by a tradition of service and efficiency."

We have already traversed the idea underlying Mr. Wells' line of thought—that we should discontinue the building of a battle-fleet—and in that we disagree with him; but for the rest we are content to travel all the way as he takes us. Nothing truer has been written on the subject of national defence than the passage quoted below:—

"A great system of laboratories and experimental stations, a systematic, industrious increase of men of the officer-aviator type, of the research-student type, of the engineer type, of the naval-officer type, of the skilled sergeant-instructor type, a methodical development of a common sentiment and a common zeal among such a body of men, is an added strength that grows greater from the moment you call it into being.

"Now that possible campaign away there, whatever its particular nature may be, which will be shaping our military and naval policy in the year 1933 or thereabouts, will certainly be quite different in its conditions from the possible campaign in Europe and the narrow seas which determines all our preparations now. . . . All our present stuff, indeed, will be on the scrap-heap then. What will not be on the scrap-heap will be such enterprise and special science and inventive power as we have got together. That is versatile. That is good to have now, and that will be good to have then.

"At present we spend about eighteen and a half millions a year upon education out of our national funds, but fourteen and a half of this, supplemented by about as much again from local sources, is consumed in merely elementary teaching. So that we spend only about four millions a year of public money on every sort of research and education above the simple democratic level. Nearly thirty millions for the foundations, and only a seventh for the edifice of will and science! Is it any marvel that, directly we are tested by such a new development as that of aeroplanes or airships, we show ourselves, in comparison with the more braced-up nations of the Continent, backward, unorganised, unimaginative, unenterprising?"

Truly, Mr. Wells has contributed to the literature of a national defence a series of articles which mark a distinct departure in the character of the viewpoint from which the subject is usually approached. To say that they provide much food for serious thought is merely to utter a platitude. They go much deeper than that—they present the matter in all its phases in a way that must carry conviction to the mind of every thinking person who reads them; and if they do not produce a deep effect on the public and those to whom the work of defence is delegated, then we are indeed, as a people, hopeless.

ARMCHAIR REFLECTIONS.

By THE DREAMER.

The Aerodrome Mechanic.

WHEN I first became interested in aviation, the thing that struck me with most force (science tells me that it isn't the force of a blow that hurts, but the speed at which it is delivered) was the great amount of enthusiasm that aerodrome mechanics put into their work. If any of these gentlemen were unfortunate enough to read what I wrote on enthusiasm a week or two ago, I beg they will unread it at once, it wasn't meant for them. When a man will cheerfully get up at daybreak on a cold winter's morning and work right through the day till late at night, and then climb into a motor car without a word (except to ask if the pilot is all right) to go miles away to a breakdown, returning, perhaps, at or after midnight, with the result of his many weeks of loving labour smashed to matchwood, and start again next morning to rebuild it with a good will, he does not want any advice from me. There was a time, long ago now, when the London cabman was known the world over as the wittiest class of man extant. The aerodrome mechanic, had he been about in those days could have given him a day's start and a beating. Moreover, he is the very essence of good temper with it. Watch him any day when there is flying on, and "his" machine is in the air. His eyes are never off it, and he watches every move and turn the pilot may make, not as you might think because he is afraid of having some repairs to do, but to see that the pilot does justice to the machine, "his" machine, and he is not backward in giving vent to his feelings should the said pilot make never so slight a fault in a "bank," or fly wide at a pylon during a race. Should he round a pylon at a greater distance than a few yards you will probably hear someone say in a very disconsolate voice, "Come on to tea Jack, he's gone to Brooklands." Sometimes a machine will suddenly drop a few feet owing to a so-called "air pocket," and somebody will shout, "Lummy, he thinks it's Saturday" (mechanics say that smashes always happen on Saturdays so they have to work on Sunday repairs). But the best illustration of the interest they take in their machines happened one day last year at Hendon. A machine had just been got under way and was taxiing out across the ground, when another pilot about to land flew straight at it, and for a moment it looked like a head on collision. Quite oblivious of the crowd of ladies and gentlemen around him, a mechanic started dancing about like a red Indian, and although the other machine was several hundred yards away, shouted at the top of a voice that could be heard all over the aerodrome, "Hi! Mind our little lot, d— you," and then blushed like a girl, but that "our little lot" meant ever so much to me, and I am quite sure he had nothing to blush about.

There are many minor accidents at an aerodrome, such as a smashed undercarriage, broken wings or struts, or even a propeller. Things that are brought about in very simple ways, but which mean much patient work destroyed and many hours of toil to put right, and I have often wondered if there is any other class of worker who can stand by and see his work broken up and then start to repair it with the same cheerfulness as he. Perhaps just a few examples of the *patois* may not be amiss here. If an engine is missing in one cylinder "the old stove has got one flue bunged up." Should it be pulling badly it's "on day work." A pilot who flies unsteadily is a "rag-timer" or a "yiddle." When a pilot cuts out his engine he's "cut her oats off." A *vol plané* is known as "a gaby." A back-fire is a "Brock's benefit." A magneto is a "juice distributor." Flying high is known as "upstairs," and low as "fool's paradise." A trick flyer is a "stunt merchant," and a steady, race flyer is a "treasure hunter," and so on, till one could almost compile a dictionary.

Gentlemen, the aerodrome mechanic is a right good chap all round, and deserves well the small amount of wages he gets, which is about *one-half* that he earns, and I should like to see him have a bumping "Mechanic's Benefit" day in the season. As Captain Cuttle used to say, "Look it up, and when found make a note of."

A Touch of Liver.

Those who know me best would tell you that I am not by any means one that could be called a grumbler, being rather inclined the other way, and generally face a hard world with a smiling face that is the real article, and simply fall over myself to grasp my fellow man by the hand, and say I am pleased to see him, and look it.

Now and again, however, I am bound to look things squarely in the face and say what I think. This is only because I know what a lot of nonsense there is going on, and I am not really grumbling at anybody, but simply telling them about it, and trying to do my best to put things right. Clarissa says it is a touch of liver, and gives me a wide berth, but that is just woman all over. If you can't see eye to eye with them "you're a nasty old thing, so there," and all the explaining that you "only want to be kind" in the

world won't put things right, and they go on hunger strike or something of that kind till a couple of theatre tickets or a little shop-window fuddle puts things right again, and I am inclined to think there is method in their madness. Now I don't want you to think I am at all like that to-night, because I am not, I never felt better in my life, and only want to talk to you (Clarissa says that's a sure sign) about something that is worrying me. Will somebody please tell me why in the world I should have to get up in the morning and go to work when I feel tired, and have to knock off in the evening and go to bed just when I feel like work? It seems to me absurd, and I believe the whole thing is summed up in one word, "Daylight." In prehistoric days, when man hunted, not fellow man, but animals for a living, it was natural that he should rise early in the morning to hunt for the dinner of himself and Mrs. Iron, Stone, Wood, or whatever their name was, not to mention the little filings, pebbles, or splinters who also had to be thought of. It was also natural that they should retire early to their little semi-detached cave when the evenings drew in, because they had no pennies to put in the slot. But now it seems to me that things can be done at night quite as well as in the daytime. How is it, otherwise, that the "tube" railways run their trains as usual during a fog whilst the above-ground companies are all at sea, and hours late, if they don't take the trains off altogether, just because they can't see. I say night is the time to work, especially in the summer when it gets dark at ten and light again at two. In the winter, of course, it is different and wants changing about, but to work by day all through the year is ridiculous. I am not going to fill this page up with this sort of thing, because my liver is in rather good condition just now, but every year somebody talks about what he calls a daylight saving bill, which means you start work earlier in the morning, and as it is just about due now I thought I would put my foot down straight away. Mr. Whatsyour-name, don't do it, you make me go all goosey.

A Lesson in Steam.

With such a young industry as aviation it is possible, I think, to learn many lessons from things that previously had passed us by unheeded, as we had no particular interest in them at the time.

I had occasion recently to be travelling from the North behind one of the monster engines on the Great Northern Railway, which was giving off great volumes of steam. There was half a gale of wind blowing the steam to my side of the track, and drifting it away over the surrounding country, and for nearly the whole journey I was interested in its behaviour in the eddies caused by the different contour of the ground as we went along.

Where the ground was quite flat the steam simply hurtled away in a straight line gently rising the while, but small hillocks, trees, or even small hollows in the ground had a most remarkable effect, and gave a very fine illustration of the difficult air currents pilots have to tussle with when flying over country that is much broken up by obstacles such as woods, hills, or even houses.

One thing I noticed was, that there always seemed to be an up-current over trees, especially if they were high and close together, such as poplars for instance. The steam drifted straight for the trees and seemed on the point of going through, as I have seen it do hundreds of times, but just a few yards short it would be violently lifted and go up vertically, and then gently bend over at the top and down on the other side at about the same distance from the trees all the time, where it would split up, part to continue on its way and part, strange to say, to be carried back through the trees low down to mingle again with that on the upward path and so once again over the trees and away.

In passing over a small hollow in the ground, say, a place 50 yards or so wide, and, perhaps, 10 to 20 feet deep, with gently sloping sides, such a place as a plough would be able to negotiate in the course of its work. I noticed that the steam would hurry along near the ground and at the edge it would split up as before, part to continue on its course and a part to be caught in a current of air coming towards me up the nearer side of the hollow, and rushed upwards at a terrific speed. The part that had continued on its way, on nearing, or just over the far side would again be split up, part getting away, and part being caught in a violent draught, and carried back into the hollow, and after traversing the whole distance would come up, and scurry away above on its original course.

I am not in the least a scientist, and the above is simply the observations of one interested, and I leave it to better heads than mine to work it out to a useful knowledge, but I really do think that those interested in problems connected with aviation might well employ what is generally looked on as wasted time during travelling by watching these curious freaks of the wind.

NATURE'S ONE-WINGED FLIERS.

By D. TOWNSEND.

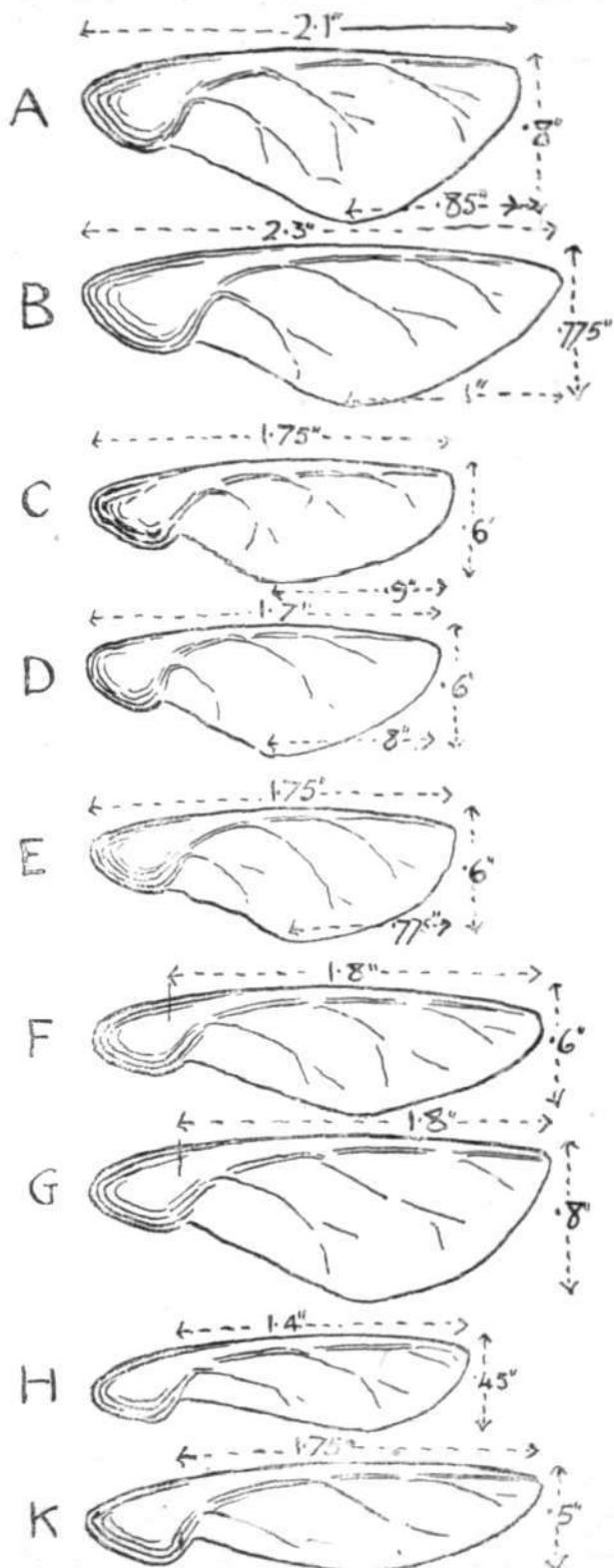
WHEN the autumn winds begin to blow, the maple seeds start dropping in their thousands. Miniature helicopters, all of them, they whirl downwards, revolving so fast that the small wing attached

but in this country one has to do with what one can get and be pleased. I managed to procure a chemist's hand scales, whose accuracy only went to $\frac{1}{2}$ grains, and a folding 2-ft. rule; for finding the areas of the wings, I constructed on a piece of tracing paper a gridiron 3 ins. by 1 in., the sides being divided into $\frac{1}{16}$ in.

In order to get a reasonable average, and to show the variety of shapes, I measured up five different examples, but for the experiments in flight I used other seeds owing to the fact that the original ones were cut up for weighing.

I now give a table of the five examples, and the average of them. The inferences of the sixth example are worked from the data which is the average of the others, except in the first case where two results, A and B, are given, A being worked from the average data, B on the other hand being the average of the five examples, as also are the aspect ratios.

The positive and negative signs when given are to show that the $\frac{1}{2}$ grain was not accurate enough, and a little ought to be, but is not, added or subtracted.



to each pod cannot be followed in its turns, and they are blown along with the wind like some diminutive air-fleet of the future.

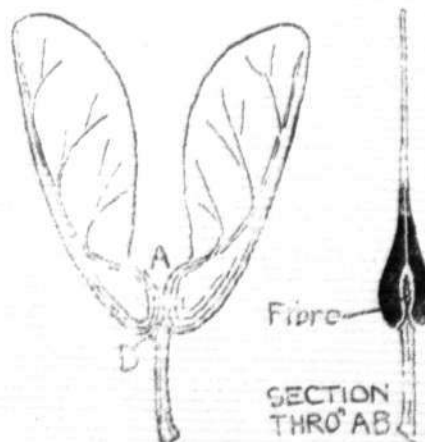
While watching these miniature flights, I thought it might be of interest to ascertain a few facts with regard to the load, area, and efficiency of these seeds. The seed consists of the pod and one wing; the former is covered with hairs of a yellow-brown tint, while the latter has a main spar in front tapering to its end.

For the purposes of my research I was deficient in apparatus,

Example.	Inferences.						Data.		
	V. Average aspect ratio.	IV. Actual aspect ratio.	III. Percentage of area to carry weight of wing.	II. Percentage of area to carry load.	I. Area to support 1 lb.		Weight of pod.	Weight of wing.	Area of wing.
A	3.5	2.6	14.3	85.7	1,584 sq. in. or 11 sq. ft.		3+	.5	1.17
B	3.83	2.96	28.6	71.4	1,801 sq. in. or 12.50 sq. ft.		2.5+	1-	1.33
C	3.9	2.91	20	80	1,612 sq. in. or 11.19 sq. ft.		2	.5+	.85
D	4.2	2.83	20	80	1,517 sq. in. or 10.54 sq. ft.		2	.5	.80
E	3.9	2.91	20	80	1,593 sq. in. or 11.06 sq. ft.		2-	.5+	.84
Average	3.866	2.842	20.7	79.3	1,621.4 sq. in. or A. 11.26 sq. ft. B. 11.25 sq. ft.		2.3	.6	.998

In working out the aspect ratio of the wing I took two readings, the first being the actual aspect ratio found by dividing the greatest span by the greatest chord; the second being an average ratio found by dividing the greatest span by an average chord, which I found by drawing the imaginary rear spar in such a way as to fill up the spaces by the surplus area.

To facilitate the working out of my first inference I used the



formula: Area to support 1 lb. = $\frac{5,760 \times .82,286 \times A}{W}$, where

A = area of seed-wing, W = weight of wing and pod; but, as I worked with logarithm tables, I used the above formula in the form: Area to support 1 lb. = antilog. of $\log. A + 3.6758 - \log. W$.

Next, I turned my attention to the flight of these seeds, but, owing to the deficiency in apparatus, my experiments were of a very elementary character. Using four different types of seed-wings,

I had them dropped from a height of 9 ft., and timed them in their flight. Their flights were made in still air, but in some cases there were spiral flights, although most were straight. In the open they go for many yards with the wind, sometimes rising, sometimes falling, according to the force and currents of the wind; sometimes they seem suddenly to change their circular motion, but generally they turn from left to right, like a clock, with the pod lower than the tip of the wing.

It is interesting to note on previous page examples A, B and D, which though of approximately the same weight have many other properties different.

It is also interesting to note nature's method of starting the seeds

in their flight; they are in bunches hanging downwards like keys, from 20 to 30 couples; each couple is attached to one stalk by means of a fibre which, at the right season, withers, breaks and sets free the seed. A couple is not naturally meant to fly, and on attempting to make one do so I found it dropped down spirally as a deadweight in still air without any rotation about its pods.

Example.	Rate in ft. per sec.	Time.	Aspect ratio.	Weight.
F ...	2'571	3'5 secs.	3	2 grains
G ...	4'5	2 "	3'6	2+ "
H ...	2'25	4 "	2'81	3'5+ "
K ...	4'5	2 "	3'1	2 "

THE MONACO MEETING.

Of the large number of hydro-aeroplanes entered for the events at Monaco, sixteen qualified to take part in the races by being on exhibition on the 3rd inst. They included a Maurice Farman, a Henry Farman, three Deperdussins, two Nieuports, two Borels, two Astras, two Breguets, one d'Artois, one Morane and one de Marcey, and were arranged in four rows in the Harbour where they were inspected by the representative of the Prince of Monaco. Several of the machines were seen in the air on the 3rd inst., notably H. Fischer, on the H. Farman, Devienne on the Deperdussin, Labouret on the Astra, and Espanet on a Nieuport. During that evening and the next day a heavy gale raged over Monaco preventing any flying, and driving the machines to shelter, with the exception of the de Marcey and Prevost's Deperdussin, which rode out the storm. Practically no flying was done until Sunday, when the hydro-aeroplanes commenced their preliminary tests. Gaubert on the M. Farman, Weymann and Espanet on Nieuports, and Labouret on the Astra made the starting up, towing and navigability tests, while Gilbert on a Morane carried out the first, and Bregi on a Breguet the last two. Four of the machines were considerably damaged on Monday, including the trio of Deperdussins, which apparently came to grief through striking the water too sharply, while Labouret's Astra came down on one wing and capsized with dire results. Prevost had previously

succeeded in putting his Deperdussin through the three tests mentioned above and the altitude and *vol plané* tests, being the only one to do so. Daucourt and Chemet, on Borels, completed the starting, towing and navigability trials, while Gilbert and Bregi finished these tests.

The preliminary tests which have to be carried out are:—

1. *Getting Under Weigh.*—The hydro-aeroplane brought to a standstill on the water, the motor stopped the pilot must be able, with the resources he can command on board, and with solely the assistance of the passenger, if one is carried, restart the motor without touching the propeller, and cover a distance of 100 metres between two lines of buoys.
2. *Altitude.*—Mount from water at least 500 metres high and return to water in less than 30 mins.
3. *Volplaning.*—Rise from water to at least 100 metres altitude, descend *vol plané* without the aid of the motor.
4. *Handling.*—The machine must be brought to the crane by the competitor and attached thereto, so that it can be raised and lowered.
5. *Towing.*—The machine must be taken in tow by any one craft, either row or motor boat, and be trailed over the course for No. 1.
6. *Navigability.*—Travel without leaving the water by aid of the motor over a course six kilometres and a quarter.

All these preliminary trials, save that for handling (Clause 4), take place outside the harbour—that is to say, in open water.



General view of the moorings for the hydro-aeroplanes competing in the Monaco Meeting this week.

BRITISH NOTES OF THE WEEK.

ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE Summary for week ending April 3rd:—

No. 1 Squadron. Farnborough.—On the 29th the "Beta" was up in a strong wind, behaving very well. The remainder of the week was devoted to kiting, free ballooning, and practice in erecting mooring mast.

No. 2 Squadron. Montrose.—On Thursday, 27th, there was a considerable amount of flying, many of the air mechanics being taken up as passengers. On the 28th and 29th no flying was possible owing to incessant wind and rain. On the 31st and April 1st and 2nd a great deal of work was put in, including several long reconnaissance flights. During the week the total number of miles flown by this Squadron exceeded 1,000. The machines used were B.E.'s and Maurice Farman's.

No. 3 Squadron. Larkhill.—On the 31st various officers were out on B.E.'s and Henry Farman's. On April 1st, the Squadron moved into camp at Durrington, close to the hangars. On the 2nd and 3rd, numerous flights on B.E.'s and Maurice and Henry Farman's were made. Satisfactory experiments with firing coloured lights out of Henry Farman's were carried out.

No. 4 Squadron. Farnborough.—Monday, 31st, was a very busy day, all the officer, warrant officer and N.C. officer pilots being out. Altogether 52 flights were made, in which staff officers participated as observers. Several air mechanics were also taken up. On the 1st and 3rd there was also a great deal of flying. The machines used were Breguets, B.E.'s and Maurice Farman's.

Army and Private Aircraft.

AN important innovation in this year's Army Annual Bill is that under the section which gives power in case of emergency to impress locomotives, motor cars, carriages, barges, &c., aircraft of all descriptions are now included.

Another Naval Air Station.

NEGOTIATIONS are now being conducted by the Admiralty with a view to establishing a station for hydro-aeroplanes at Leven. The piece of land which is being leased by the Government is situated between the high-water mark and the golf links.

An Inspection at Montrose.

SOME splendid work was done by the flying officers at Montrose last week, and on the 3rd inst. the squadron was inspected by Major Sykes, commandant of the military wing R.F.C. On the previous day Major Burke and Capt. Longcroft were up on B.E.'s, the latter going to Arbroath, Chapelton and Dundee. Capt. Becke and Lieuts. Martyn, Pepper and McLean were also out on Maurice Farman's. Permission is being sought by the War Office for the aeroplanes to land in Victoria Park when visiting Arbroath.

A Naval Flyer at Harwich.

LAST week Capt. Gordon, of the Naval Wing of the Royal Flying Corps, indulged in some flying at Shotley, Harwich, at which place he arrived on his Farman biplane from Eastchurch, on the 1st inst., the trip taking 50 mins. During his stay at Shotley, Capt. Gordon took a large number of the officers at the Shotley establishment for short trips.

Military Aviation in India.

IN reply to a question in the House of Commons on Tuesday, the Hon. E. S. Montagu, Under-Secretary for India, stated that a scheme for providing an air fleet for the Indian Army was now being considered. Details could not yet be announced.

The Daily Mail Prizes.

DURING the past week a great deal of enthusiasm has been aroused up and down the country, and also abroad, by the latest prizes offered by the *Daily Mail*, and according to that journal several more tentative entries have been received up to date; the list of intending entrants is announced as follows:—

M. Perreyon, holder of the world's height record, in a Blériot.

Messrs. James Radley and Gordon England, in the 150-h.p. waterplane completed at Huntingdon.

M. Wynmalen, the Belgian airman, in a machine of his own design.

Col. Cody, in a Cody machine.

Mr. Arthur Wigram, in a machine built at Cowes.

Herr Rumpier, inventor of the German Taube (Dove) monoplanes.

The Eastbourne Aviation Co.

Mr. Hall at Chesterfield.

HAVING repaired the damage sustained by his Blériot machine on Easter Monday, Mr. J. L. Hall, on Wednesday last week, made three very fine flights at Chesterfield.

The Mansion House Meeting.

IT is to be hoped that the patriotic meeting which the Lord Mayor has consented to hold at the Mansion House, at the request of the Aerial Defence Committee of the Navy League, on Monday, May 5th, at 3.30 p.m., will bring our present Government to the realisation of this country's needs in aircraft. It is becoming daily a more desperate cause, and even if a half-million, nay a million or more, be lost in experimental work, what of it? The experience gained thereby will be worth it presently fortyfold. Let the meeting be one that will start a campaign which will refuse to be silenced until it has attained its object.

The Dunne Monoplane in France.

ALTHOUGH the weather has been very unpleasant Mr. Percival has been putting in some excellent work at Villacoublay on the French-built Dunne monoplane. A day or two ago the machine, which climbs very rapidly, went up to 600 feet, and the pilot suddenly found himself in a thick fog. After flying for some 12 mins., Mr. Percival was able to distinguish the sheds, and made a good landing. The French military authorities are taking great interest in the machine, and Mr. Percival is anxiously awaiting better weather so as to be able to show what it can do. Several times during his flights the pilot has taken his hands from the controls and waved them above his head.

A Lecture by Mr. A. Low.

BEFORE the Junior Institution of Engineers at their meeting on April 23rd, Mr. Archibald Low, chief designer of the aviation department of Messrs. Vickers Ltd., will lecture on "Modern Developments of Aeroplane Theory." The meeting will be held at the Institution of Electrical Engineers, Victoria Embankment, and will commence at 8 p.m.

The National Aspect of Aviation.

IN accordance with the league's policy of arousing public interest in aeronautics, Col. H. S. Massy, C.B., will give a lecture for the Women's Aerial League on Wednesday, April 30th, at 8.30, at the Kensington Town Hall. The lecture will deal with aviation from the National point of view, and will be profusely illustrated with the most up-to-date slides. Mr. Alan Burgoyne, M.P., will take the chair. Tickets may be had from the Hon. Secretary, Denison House, Vauxhall Bridge Road.

Blackburn Work.

ON Monday last week, Mr. H. Blackburn made a flight from Lofthouse Park, near Leeds, round Wakefield, encircling the town at an altitude of 1,500 ft. From any part of the town one had a clear view of the machine. Lofthouse Park is the site of the new Yorkshire Aerodrome, which is to be officially opened at Whitsuntide. Flying exhibitions will be given Wednesdays and Saturdays throughout the year. H. Blackburn, who is doing extensive flying all round this district, is raising the public interest in flying to such an extent that there is no doubt but that the aerodrome will be well visited on exhibition days.

On Wednesday and Thursday of last week Blackburn gave an exhibition at Stamford. On his initial flight he made a fine flight in a strong wind. Rising to an altitude of about 1,200 ft., he made a large detour of Stamford, distributing 2,500 handbills over the whole range of the town. Although the wind was very strong during the whole two days of the exhibition, he put up some very good flights, making some graceful banked turns with his usual skill.

Mr. Hamel's Tenth Channel Crossing.

ON Wednesday last week, Mr. Hamel made his tenth trip across the English Channel on his Blériot. Starting from Dover at 10 mins. past eight, he made his way to Calais with the intention of flying across France to Cologne, but engine trouble necessitated a stop at Malines. Mr. Hamel was accompanied by a passenger.

Propellers and World's Records.

REFERRING to a paragraph in our last issue, on the subject of the Garuda propeller, the Integral Propeller Co., Ltd., write us as follows:—

"We notice in this week's issue a paragraph referring to the records held by the Garuda propeller. May we in fairness to ourselves ask you to kindly rectify this statement as same is inaccurate. The Integral propeller holds the following world's records: height records, with 3, 4, 5 passengers; duration records, with 2, 6, 7, 8 passengers. We also hold the duration record with 9 passengers on board, and the altitude record with 6 passengers."

FOREIGN AVIATION NEWS.

M. Clement Honoured.

THE French Government has recently conferred two honours upon M. A. Clement, the head of the famous French motor firm and vice-chairman of Clement-Talbot Ltd., and who has been so prominent in forwarding the conquest of the air, both by dirigibles and aeroplanes. Not only has he been promoted commander of the Legion d'Honneur, but he has had conferred upon him the name of Bayard so that he is now known as M. Clement Bayard.

Touring on a Farman.

ACCOMPANIED by a passenger, Letort, on his Henry Farman, fitted with 9-cyl. 80-h.p. Rhone motor, went from Amberieu to Lyon on the 1st, and from Lyon to Macon, and Macon to Nevers on the following day, and arrived at Etampes on the morning of the 3rd. The last stage from Nevers to Etampes took 2 hrs. 5 mins.

New Caudron Superior Pilot.

ON the 2nd inst., at Crotoy, on a 50-h.p. Caudron biplane, Sapper Chanteroup made his 1½ hours' test flight for a military certificate. On the 3rd, Corporal Deloche flew from Crotoy to Boulogne. Corporal Strohl completed his tests on the 2nd inst. with a flight from Crotoy to St. Cyr and back, with a landing on Beauvais, a distance of 300 kiloms.

A Maurice Farman for Spain.

IN spite of a very strong wind, Col. Vives y Vich and other Spanish officers who visited Buc on the 2nd inst., were able to see carried out the trials with a M. Farman biplane ordered by their Government. With Bernard in charge it climbed 250 metres in 3 mins., while Fourny subsequently flew the machine for over an hour, and carried out the other tests in fine style.

Fast Flying on a Dep.

CAPT. AUBRY returned on his Clerget-Deperdussin from Longwy to Rheims, on the 2nd inst., in 1 hr. 14 mins., his average speed working out to 134 kiloms. per hour.

A Deperdussin Superior Pilot.

FOR his second qualifying flight for a superior certificate, Lieut. Redelsperger, on the 2nd inst., flew on his Deperdussin monoplane from the Betheny aerodrome, near Rheims, to St. Cyr, his speed being about 120 k.p.h.

Long Trip on a Farman.

THE French non-commissioned officer Corbeil, on the 3rd inst., went on his Henry Farman biplane from Etampes to Chartres and Vendome and then back to Etampes. The trip counts as one test for a superior *brevet*.

A Fast Farman.

AT Chalons on Saturday last, Testulat was testing a small Henry Farman biplane, which, fitted with a 70-h.p. Gnome motor, and carrying a load of 250 kilogs., attained a speed of 97 kiloms. per hour. On the previous day, with the same load, it rose 550 metres in five minutes, and came down with motor completely stopped in 30 secs.

Guillaux Returns to Issy.

ON the 2nd inst. Guillaux, on his Clement Bayard monoplane, went from the Vidamee Aerodrome to Compiègne in 30 mins. After spending half an hour with Martinet at his headquarters at the Corbeaulieu Aerodrome, and paying over some money received on behalf of the Association Amicale des Aviateurs, Guillaux restarted and after 55 mins. flying landed safely at Issy, flying *en route* across Paris for the 31st time.

Cross-Country Work on Farman.

ON the 4th inst., Lieut. Prat, of the Toulon aviation centre, went from Toul to Rheims on his 80-h.p. Gnome-H. Farman, while Lieut. Remy took delivery of a new machine of similar design, and flew on it from Etampes to Chalons Camp.

Two Hours on a Nieuport.

AMONG a series of fine flights by pupils at the Nieuport School at Villacoublay, on Saturday last, one of the best was made by Sapper Roland, who, on a 50-h.p. military machine was flying for two hours at a height of 1,000 metres.

Testing Farman in the Rain.

ALTHOUGH it rained hard and there was a strong wind blowing at Buc on the 1st inst., a full day's work was put in at the Farman school. In the morning Bernard flew over to Etampes with a passenger and in the afternoon Henry Farman tested three machines for the British Government and one for the French Army, and afterwards was taken for a "joy ride" upon one of his machines by his brother Maurice.

A New Monoplane over Paris.

ON Sunday morning Latzel on the new Brageas monoplane with 40-h.p. Anzani engine started from Juvisy, and after doubling the Eiffel Tower flew over Paris and returned to Juvisy.

Two Fatalities in France.

THE biplane of Adjutant Faure while flying at Buc on the 2nd inst., was apparently caught in a remous, and fell about 300 ft., the pilot being thrown out and killed on the spot. A second fatal accident occurred on the same day at Amiens, when Sergeant Chantaud was landing after a flight from Rheims. His machine came down on the left wing, and turned right over on top of the pilot, who sustained a broken neck, and died instantly.

Flying Over Longchamp Races.

ON Sunday, Champel on his biplane, which is fitted with a 10-cyl. 100-h.p. Anzani motor, started from Juvisy and flew over the Longchamp racecourse. The machine carried three passengers in addition to the pilot, and, in returning to Juvisy, passed over Paris at a height of 1,000 metres.

The Tamise Meeting Awards.

FOLLOWING the successful appeal of Renaux to the F.A.I. the Belgian Aero Club has revised the list of marks for the various events which were contested at the Tamise hydro-aeroplane meeting and as a result has awarded the first place to Benoist on the Sanchez-Besa; second, to Chemet, on Borel; third, to Renaux, on Maurice Farman; fourth, to Molla, on R.E.P.

Belgian-Dutch Event for Waterplanes.

THE Aero Club of Belgium is working on the organisation of an hydro-aeroplane competition to be held this year. Starting from Liege, the competitors would go by Maestricht into Holland and would return by way of Antwerp and Tamise to Ghent.

Aviation in the Congo.

IN the estimates for this year's expenditure in the Belgian Congo, a sum of £4,000 is set aside for the purpose of encouraging aviation in the colony.

Brindejone des Moulinais in Madrid.

AFTER several delays *en route* Brindejone des Moulinais arrived on his Morane in Madrid on the 1st inst., when he flew to the Four Winds Aerodrome from Burgos, with a landing at Granja. On Saturday last he commenced the return journey to France and after stopping at Guadalajara and Saragossa he arrived safely at Barcelona.

Progress of Lieut. Calderara.

SOME details are just to hand concerning successful trials which have been made recently by Lieut. Calderara with the hydro-aeroplane, of which we gave particulars and illustrations in our issue of March 1st. Since his return to Italy on the 27th ult., Lieut. Calderara has been flying the machine regularly every day over the Gulf of Spezia. Some special work was accomplished on the 30th ult., on the occasion of the launching of the new Italian Dreadnought "Andrea Doria" in the presence of their Majesties the King and Queen of Italy. For some time the machine carried out evolutions and hovered over the new battleship and other vessels of the Italian Home Fleet assembled at Spezia. One of the most important flights so far carried out, was made on the 4th inst., when with three passengers, in addition to Lieut. Calderara on board, the hydro-aeroplane made a flight of an hour's duration at a height of between 350 and 400 ft. in a strong wind.

The Wright Hydro-aeroplane.

ON his return to America from Berlin, Mr. Orville Wright stated that the Wright factory would now pay special attention to producing a hydro-aeroplane which could be used on rough water. He believes the hydro-aeroplane is the ship of the future.

The Wright Patents in America.

ACCORDING to a statement from the offices of Glenn H. Curtiss at Hammondsport, N.Y., an appeal will be taken from the recent adverse decision of the district Court, and Glenn Curtiss feels certain that the appeal will result in a reversal, as did the appeal from the original decision some years ago.

A Fatality in America.

ONE of the American Army pilots, Lieut. Rex Chandler, was injured fatally in the fall of a hydro-aeroplane at San Diego, Cal., on Tuesday. The machine fell from a height of 100 ft. into the bay, and Lieut. Brereton, who was acting as pilot, was seriously injured.

What Chili Will Spend.

A LAW has been passed in Chili earmarking a sum of £52,500 for the purpose of organising a military flying corps, and for establishing a school for the training of officers as pilots.

Models

Edited by V. E. JOHNSON, M.A.

An Attempt to Obtain a Greater Measure of Longitudinal Stability in a Model.

We have received from a correspondent (Mr. M. H. Canning), the following communication *re* the above, which we publish both because such types of experiments are worthy of every encouragement, and also with a view of inviting the criticisms of our readers on the same.

We might just mention, to avoid any misunderstanding, that the elevator is not fixed during any flight, but pivoted at the centre of pressure for some given angle, the idea being that whatever the attitude of the machine the elevator should remain at the same angle. The method adopted by our correspondent is to find the centre of pressure for a given angle (1 in 7, say), and then to mount the elevator on the machine by pivoting it at the centre of pressure. The centre of gravity of the elevator is also made to coincide with the centre of pressure by the addition of small weights to the leading edge of the elevator, the main idea being that if the angle between the chord of the elevator and the horizontal one is constant, no matter what the position of the machine, the result will be a greater degree of longitudinal stability on the part of the model.

"While flying one of my models I was struck by the idea that I could obtain more longitudinal stability if I could only arrange to

stability than the ordinary type, I constructed another model with exactly the same dimensions and loading, but with a fixed elevator.

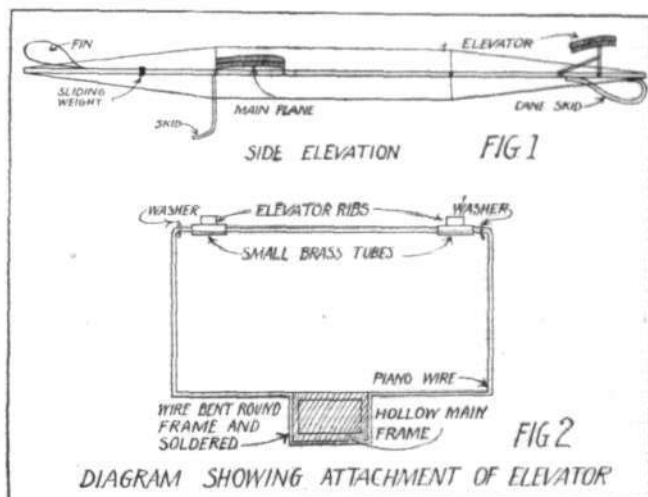
"The tests given were: (1) Model projected downwards at angle of 45° ; (2) model projected upwards at angle of 45° ; (3) model dropped with frame vertical; (4) model dropped with frame horizontal.

"Tests were conducted from a platform about 12 ft. high. In tests 1 and 2 both models recovered, but the stability of the movable elevator one was apparent, and it covered a much greater distance before touching the ground. In test 3 the fixed elevator model did not recover in time to glide.

"In test 4 there was a slight advantage in favour of the movable elevator machine."

The K. and M.A. Association.

In a recent article in the French *Temps*, on models and kites, the writer draws attention to the Kite and Model Aeroplane Association, and after giving a list of its records, &c., he impresses on the French nation the importance of either forming a commission or committee, or the taking up of the matter by the Aero Club of France, the writer, in conclusion, holding up the English Association as a model to be copied. Now, without a doubt, an association which can meet with such appreciation from a nation so much to the fore in aeronautical matters as the French is an association which should meet with every support on the part of aeromodelists throughout this country. The rise and progress made by the association since its inauguration on February 27th, 1909, has been most rapid, and in certain respects most useful as well. During last year no less than seventeen competitions

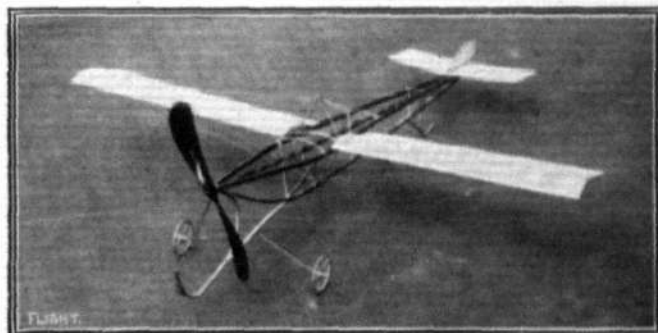


Diagrams showing the side elevation and attachment of elevator.

keep the elevator at a constant angle during flight, no matter what the position of the rest of the machine was in. I saw that if the front of the machine rose the main plane would have an increased angle of incidence, and as the lift of the elevator was the same, the machine would tend to resume its normal position in flight. If the front fell the main plane would have decreased lift, and would also fall till the frame was horizontal.

"To obtain an elevator which would keep a constant angle in flight, I made a small plane, and pivoted it at a point on the underside, approximately at its centre of pressure. I then placed a small weight on the front edge of the plane, so that it might balance in any position. The angle I chose for its incidence was 1 in 7. The method of pivoting the elevator, and the fixing of its carrier to the frame, is shown diagrammatically in Diagram 2. The model to which the elevator was fixed was a glider only, about 3 ft. long. As it was without propellers, the main plane was placed farther forward than is usual in the ordinary elevator in front type models. The model is shown in side elevation in Diagram 1. A small sliding weight of about $\frac{1}{2}$ oz. was placed on the frame in rear of the main plane to make minor adjustments. I had to experiment a good deal to find out the correct position of the centre of pressure of the elevator for the angle of incidence desired. A fair amount of dihedral angle was given to the main plane in order to give the model good lateral stability in order that the observation of the behaviour of the model in the air might be as easy as possible.

"To see if this model had really a larger amount of longitudinal



Mr. J. H. Dollittle's Olympia model. Awarded very high marks for design and construction, but did not compete in the flying tests at Hendon.

were held—fourteen for models and three for kites. But competitions cannot be arranged and good prizes awarded without considerable funds, and the same remark applies to the carrying on of the general work of the Association, and additional members and increased funds would at the present juncture be of inestimable value. There is not a single aeromodelist, or anyone interested in models or aviation generally throughout the country, but could well afford to be either a Member, Associate Fellow, or Fellow, and by thus helping the only officially recognised body to deal with models and kites, he or she would be doing something to further the cause in which they are interested. One can scarcely overestimate the value of a strong and powerful paramount body in any art or science. Two things are essential for such to be the case, viz., a large membership and ample funds. Provided the first be obtained, the second generally follows as a matter of course. All and each interested in model work, either as a sport or as a scientific adjunct to aeronautical matters generally, should take the earliest opportunity of joining the Association, and inducing as many as possible of their friends to do the same.

Every effort (on the part of the Association) will be made to hold a great international competition during the present year. If those in this country are either unable or unwilling to raise the necessary funds, then the French offer will undoubtedly have to be accepted and the meeting held abroad, which would no doubt not only prevent many English aeromodelists from being among the competitors, but would also not reflect greatly to the credit of England, which

undoubtedly (at present at any rate) numbers amongst its inhabitants a body of aeromodellists second to none in the world.

The Daily Mail Prizes and Models.

The above £10,000 and £5,000 prizes for hydro-aeroplanes, together with other prizes for the same type, combined with the Monaco meeting, &c., have again brought this particular type of machine and model into prominence, and we have a considerable number of communications, photographs, drawings, &c., to hand, with which we propose to deal as speedily as occasion will allow.

Looked at merely from a common-sense point of view, this particular type appears especially adapted to be the national type of aeroplane, of aerial defence and offence, and of aerial travel to all foreign countries, and in consequence its model prototype should be worthy of especial study. *Provided the model be of sufficient size*, there are undoubtedly certain points in the complete scientific solution of this most difficult mechanical problem which could be investigated in model form in quite a satisfactory manner, and at infinitely less cost, to say nothing of risk, than in the case of full-sized machines, and the present is undoubtedly a most opportune moment for someone to come forward with a prize or prizes for models which shall bear some proportionate relative value to those offered by the *Daily Mail*—always, of course, provided that certain stipulated conditions and tests are successfully fulfilled, and that the actual competing models have passed all the eliminating trials. For any results to be obtained which would be of value, the prizes would, however, have to be very considerably in excess of any yet offered for models, exception alone being taken to those offered for models by the *Daily Mail* in 1906.

Messrs. T. W. K. Clarke's Model Aero Fabrics and Special Steel Wire.

We have received from the above firm three samples of the aero fabric supplied by them—one white, one green and one aluminium coated. These silk fabrics appear quite suitable in every way for models; they can be supplied in any length, and are 36 inches wide. We have also received from them some of their specially tempered steel wire, the great point with respect to which is that it unrolls perfectly straight from the coil, which is a point which all aeromodellists who have constructed wire planes, chassis, &c., from ordinary steel piano wire are certain to appreciate. We have personally constructed a small plane with the sample sent, and it is perfectly satisfactory, nor does the special tempering appear in any way to have made the wire inferior in any respect, considering that for the ordinary sized model steel wire is undoubtedly the best substance to employ for chassis, the fixing of floats, &c., as well as for the planes themselves, owing chiefly to the low head resistance offered by such. There will be, we should think, a large and ready sale for such. We can certainly most cordially recommend it.

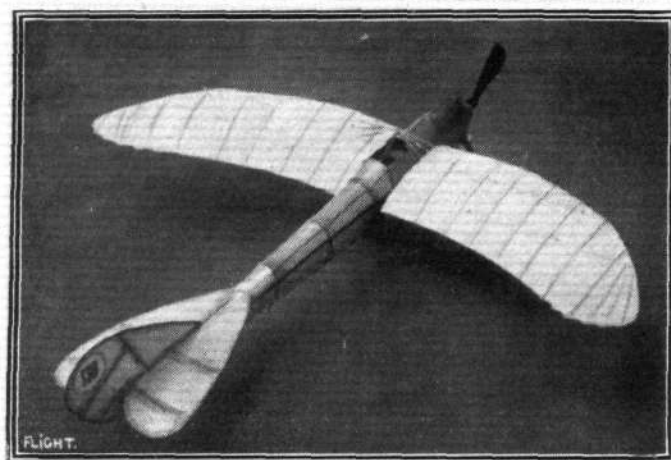
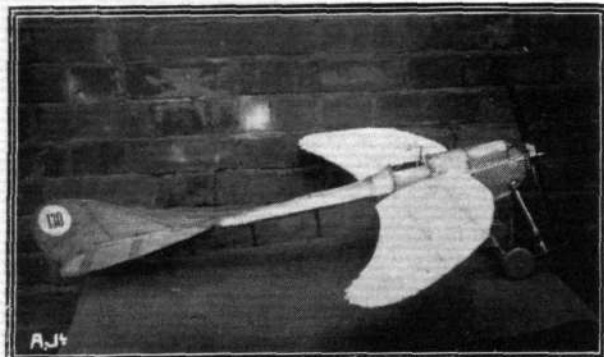
"Flight" Model Supplement.

Unless aeromodellists who exhibited at Olympia send along particulars of their machines without any further delay, the idea of issuing a special model supplement must be abandoned. Our best thanks are due to the few who have been so good as to send particulars, photographs, &c., and we shall be pleased to use them in these columns. The supplement would have undoubtedly formed an interesting souvenir of the exhibition, and had exhibitors sent us along particulars of the areas, loadings, probable powers and speeds, &c., of their machines, with a view to comparing them, if possible, with birds and full-sized machines, much useful information would

undoubtedly have been gained. The matter is one, however, which must rest entirely in the hands of those who could supply the necessary information.

Mr. J. W. Burghope's Olympia Model.

Chief particulars: Monoplane; double-surfaced Handley Page-Weiss wings. Length 32 ins., span 36 ins., weight 12'5 ozs.,



One of Mr. J. W. Burghope's Olympia models.

loading 12'4 ozs. to sq. ft., area of wings 150 sq. ins., diameter of propeller 11 ins., rubber-sprung chassis, lifting tail.

Mr. Oliver's Query—Reply to.

Mr. P. Moss, writing *re* the above, says: "A good home-made lubricant can be made from the following mixed together and boiled for about 3 mins.: Soft soap 2 ozs., glycerine 1 oz., water 8 ozs."

Replies in Brief.

J. MCRAE.—In reply to your communication, we wish to point out to you that it is quite possible for the gentleman to whom you refer to purchase a model of more than one type and from more than one maker.

J. MOSS, E. N. JOYCE.—We will endeavour to make use of your communications later on.

CORRESPONDENCE.

. The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which have appeared in *FLIGHT*, would much facilitate ready reference by quoting the number of each letter.

Rules Relating to Committee Elections.

[1748] On page 357 of your issue of the 29th ult. you have been good enough to mention an alteration to Rule 9, the wording of which as originally drafted was "no ballot paper which is signed or on which the number of candidates voted for is more or less than the number of vacancies . . . shall be valid." The alteration which I proposed, and which was carried by 23 to 9, was that the words "or less" be omitted, so as not to compel members to vote for more candidates than those of whom they had special knowledge. To have to vote for a fixed number entails voting in favour of one or more candidates whose names one has, perhaps, never heard of before, and such a vote counts as much as the vote that is given to a candidate whom one knows to be a first-class man. This method largely masks the real opinions of the members with regard to the respective candidates, and sometimes secures the election of men who, with a rational system of balloting, would not

be elected. Hence the change, though slight in words, is very important in character, and the members are to be congratulated on having made it.

April 3rd, 1913.

A. S. E. ACKERMANN.

[No doubt the effect of the alteration is what our correspondent points out, but the dangerous rock upon which the rule as it now stands may come to abuse is the power it gives for "plumping" to ensure getting one or more particular individuals on to the committee. In agreeing to the alteration it would have been as well to have put in a partial antidote in the form of making canvassing, directly or indirectly, for the election of a candidate, grounds for automatic disqualification of such candidate if elected. We shall hope, nevertheless, to see this alteration "revised" to its original form.—Ed.]

Inclement Weather and School Tuition.

[1749] On reading the reports "from the British Flying Grounds" in this week's issue of *FLIGHT*, it is remarkable to note how often inclement weather has prevented school work.

It appears that a great many aviators are compelled to waste their time and to have their patience sorely tried, while awaiting favourable opportunities.

Of course we Britons have learned to be somewhat philosophic in regard to our climate, but do you not think we are carrying that philosophy too far?

I would like to suggest that, though the weather may not be altered, it can be foretold with a considerable degree of accuracy, and if aviators would consider the uses of meteorology, and avail themselves of the services of its best exponents, they would be spared much disappointment. They would know with tolerable certainty whether they would be able to practise on the morrow or not.

I am aware that nobody places much reliance on the weather forecasts as they appear in the Press, but I, who have achieved some reputation as a weather expert myself, would very much like to see a meteorological competition got up, open to all comers, official and unofficial meteorologists. Let the forecasts be designed for purposes of any one or all of the British Flying Schools, and let them be judged according to their truth and usefulness.

I see no reason why the skill of weather experts should not be tested any more than that of aviators.

Sheffield.

GERRARD H. HICKSON.

A Students' Institution.

[1750] At the suggestion of several aviators, engineers, and flying-pupils seriously interested in aeronautical science, I have undertaken to try and organise on, or near, one of the principal flying grounds an institution, provided with a specially fitted laboratory and various testing apparatus, where students of aeronautics could study and discuss questions of theoretical and practical interest. The value to aeronautical science of the discussion and study of aeronautical problems in the special "atmosphere" of an aerodrome cannot be over-estimated.

I should, therefore, be much obliged to you for your courtesy in publishing this letter, which will enable me to get into touch with all those whom the matter may interest.

L. BLIN DESBLEDS.

(Lecturer in Aeronautical Engineering at the University of Sheffield and at The Polytechnic, London).

39, Victoria Street,
Westminster.

Streamlines.

[1751] Some very interesting differences of opinion have been discussed in these columns recently on the subject of streamlines. It would seem evident that these differences are in many cases stimulated by our true lack of knowledge on the subject; at the same time, it would appear that many of the ideas expressed must be erroneous.

In the first place, it is universally forgotten that the laws which govern the impingement of one solid body into another of softer composition (pin-points into cloth), the motion of partially submerged bodies and totally submerged bodies in a "fluid" are entirely different and must not be confused. It is the case of totally submerged bodies only with which we are at present dealing.

The data at present available shows us that the resistance of such bodies is caused by breaking up the flow or streamlines of the fluid through which the body moves.

This resistance is composed of two factors: 1. The lines or shape of the body; 2. The nature of its surface. The latter causes minute

cyclic disturbances producing skin friction, whilst the former causes the flow to be broken up, more or less, according as the lines are good or bad.

The results of Ogilvie's strut experiments furnish us with excellent examples of good and bad streamlines, and I think readers of FLIGHT could not do better than refer to the notes published at the foot of p. 712 (in August 3rd, 1912, FLIGHT). It was here pointed out that the most important portion of the lines lies with the rate of

change of curvature of the run from the thickest part to the after part. The air stream may be parted in almost any way, but once parted it should be closed very gradually, and if the flow is once broken up the section is immaterial and may be entirely cut away.

This latter fact has been borne out by the N.P.L. experiments on streamline bodies, in which successive segments of the tail were removed; no appreciable increase in resistance was experienced up to a point when an amount equal to 6 of the tail was cut off. This

explains the high positions of the truncated sections 39, 40 and 41 in Ogilvie's table.

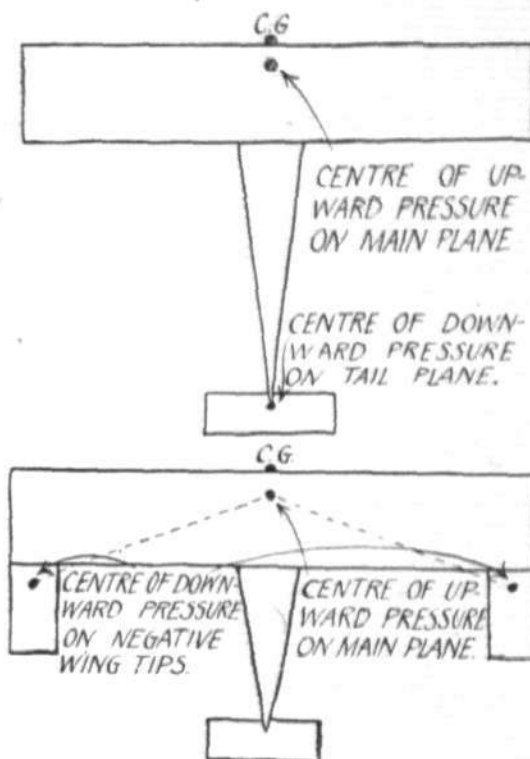
The enclosed drawings, made from the N.P.L. streamline photographs published in the Technical Report of the Advisory Committee for Aeronautics, emphasize the importance of the rate of change of curvature.

C. IAN BURRELL.

[We refer to this letter editorially.—ED.]

Negative Wing Tips.

[1752] In a note on Fig. 3 of my letter of February 24, 1913, I said that the advantageous effect of negative angle lateral balancers is not interfered with by giving both balancers an initial negative angle of incidence which is useful for other reasons of stability. Some of the advantages of this use of the negative angle have recently been discussed by Mr. Berriman in FLIGHT. It seems possible that one important advantage of an initial negative angle of incidence behind the centre of gravity of the machine arises from the fact that it virtually introduces the well-known stabilizing



principle of the upward longitudinal V and that, if the negative wing tips or separate negative lateral balancers are set sufficiently far back, and sufficiently wide apart laterally, the distribution of pressure on the system as a whole is even more conducive to stability than is the case with an aeroplane with a single upward V between the main plane and the tail and having the latter set at a negative angle, as I have attempted to show in the accompanying diagrams.

In Fig. 1, though the principle of the upward longitudinal V is introduced, this type seems less likely to be stable laterally than the one shown in Fig. 2, in which two diagonal upward V's between main and trailing planes, along the dotted lines, are introduced, thus tending to diagonal or both longitudinal and lateral stability combined on the same principle. An initial negative angle of incidence given to well recessed wing tips or to separate balancers does actually appear to impart some extra stability under ordinary conditions at all events, and the above theory is tentatively advanced as one possible explanation. If it is correct it would appear to be unnecessary where there are negative wing tips, to also adopt a lateral dihedral with its attendant disadvantages in the main planes. I should like to take this opportunity of explaining more clearly my reason for advocating the use of the independent working of lateral negative angle balancing planes or wing tips, and my objection to attempting to right an aeroplane laterally by any other means, such, for instance, as the introduction of an additional negative angle on one side and an additional positive angle on the other as appears to be the practice in some aeroplanes at present. The introduction of a positive angle, which did not exist prior to the action of attempting to right the aeroplane, results in a new drag on that side of the aeroplane, which is presumably the side which it is intended to raise, and this back drag is prejudicial to raising that side of the aeroplane. A similar prejudicial effect is produced by increasing an existing positive angle. It is, therefore,

dangerous to introduce a new lateral positive angle in the action of righting an aeroplane, and we have to resort to manipulation of lateral negative angles as the birds appear to do. If we have two lateral planes normally floating in the wind we must dip one of them with front edge down and rear edge up so as to introduce the negative angle on that side. If we have two lateral planes set at an initial negative angle, we may increase the negative angle of one, or reduce that of the other, or do both of these things, but we must not be able, even by accident, to impart a positive angle to either of them. This is easily arranged by having the central wires connected in such a way as to make it possible to pull the planes in one direction only, that of the negative angle of incidence.

The conditions of flight are so varied that it is not safe to rely entirely on either theory or model experiment, and I shall, if possible, put these theories to practical tests on the aeroplane I am building, but I think it is a pity that the nation is not doing more than it is at present in experimenting with models at the National Physical Laboratory, and if we are to spend large sums on aviation in the near future, as seems probable, it might be worth while to consider the advisability of constructing a wind channel sufficiently large to take even a full-sized aeroplane with a pilot at the control lever. As this would certainly save the smashing up of many aeroplanes and their pilots and would end the innumerable controversies and uncertainties of the present stage of progress, it would appear to be worth a considerable financial sacrifice to acquire, and it does not seem that the engineering difficulties involved are insuperable. Such a channel would, moreover, probably provide the best means for testing the strength, as well as the stability and flying powers, of new aeroplanes and new devices for them, and would be useful in school work.

Meerut, March 6th.

H. S. WILDEBLOOD.

Flying at Aerodromes.

[1753] I think I voice the opinion of the majority of those who visit Brooklands on Sunday afternoon when I say that airmen should be prohibited from flying over the crowd and cars collected in front of the "Blue Bird." When one goes up, either as pilot or passenger, for sport, swank, or spondulix, or a combination of the three, it is a matter of taking risks with one's eyes open. But there is no profit or sport in being squashed like a beetle on the ground because somebody else elects to do stunts over one's head. No doubt a *vol pique* over the heads of the spectators is most sensational, but it is not quite fair to the crowd.

Kensington.

"FUR BOOTS."

KITE AND MODEL AEROPLANE ASSOCIATION.

Official Notices.

British Model Records.

Hand-launched ...	{ Distance ...	A. E. Woollard ...	477 yards.
	{ Duration ...	A. F. Houlberg ...	89 secs.
Off ground ...	{ Distance ...	G. Rowlands ...	232 yards.
	{ Duration ...	A. F. Houlberg ...	51 secs.
Hydro, off water ...	{ Duration ...	G. P. Bragg-Smith ...	25 secs.
Single-tractor screw, hand-launched ...	{ Distance ...	F. G. Hindsley ...	173 yards.
	{ Duration ...	J. E. Louch ...	44 secs.
Do., off ground ...	{ Duration ...	J. E. Louch ...	40 secs.

Official Trials for Hydro-Aeroplanes.—The next officially observed flights for the purpose of establishing records will by special request be for hydro-aeroplanes, and will be held at the Rushmore Pond, Wimbledon Common, on Saturday, April 26th, at 3 p.m. All applications should be sent in to the hon. secretary at once.

Discussion.—A discussion on "Hydro-Aeroplanes" will be opened by Mr. V. E. Johnson, M.A. (Model Editor, FLIGHT), on Thursday, April 24th, at 7.30, at the St. Paul's Institute, Floral Street, Covent Garden (by kind permission of the Rector). The Institute is about one minute's walk from Covent Garden Tube Station. It is hoped that all members will make a special effort to attend, as it will be a most interesting discussion. The best known designers have stated that they will take part.

Engine Bench Tests.—These take place to-day (Saturday, 12th), at the East London College. See official notices in issue of April 5th for details.

27, Victory Road, Wimbledon, S.W.

W. H. AKEHURST, Hon. Sec.

MODEL CLUB DIARY AND REPORTS.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Paddington and Districts (77, SWINDERBY ROAD, WEMBLEY).

SATURDAY, April 12th, hand-launched duration handicap.

Sheffield Model Aero Club (35, PENRHYN ROAD, SHEFFIELD).

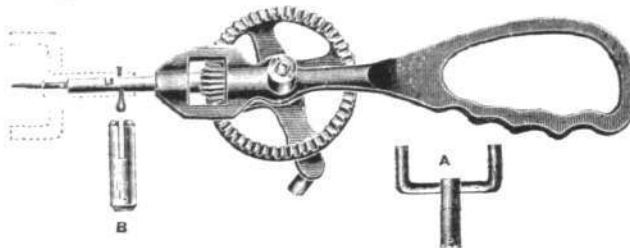
GENERAL meeting April 14th, at the club room, Carver Street, 7.30 p.m. (important business). April 21st, special lecture, profusely illustrated with lantern slides, on the History of a Modern Aeroplane, will be given by Mr. H. Slack, under the auspices of the above club, at Christ Church, Ecclesall Road, Sheffield, at 7.30 p.m. Chairman, Mr. E. W. Colver.

S. Eastern Model Ae.C. (1, RAILWAY APPROACH, BROCKLEY).

FLYING will take place at Woolwich, Blackheath, Lee and Mitcham at the usual times.

A Flourishing Model Business.

OWING to the great increase in their business, Messrs. J. Bonn and Co., Ltd., of 97, New Oxford Street, are shortly removing to more commodious premises. This to our mind is overwhelming testimony to the excellence of the materials supplied, and the



general promptitude and attention paid to all orders entrusted to the firm. Their latest catalogue which comes under our notice should most certainly be in the possession of every model enthusiast. We illustrate herewith the firm's latest geared winder (not an egg-beater), which is undoubtedly an ingenious and effective little instrument.



PUBLICATIONS RECEIVED.

Mechanische Grundlagen des Flugzeugbaues. Vols. I and II. By A. Baumann. Munich: R. Oldenbourg. Price 4 marks per volume.

Bau und Betrieb von Prall-Luftschiffen. Vol. II. By Richard Basenach. Munich: R. Oldenbourg. Price 3 marks.

Helps and Hindrances in Photography. London, E.C.: Burroughes, Wellcome and Co.

The A.B.C. Guide to Patents for Inventions. By Robert E. Phillips, M.I.Mech.E., and A. Millward Flack, Fel. Chart. Inst. P.A. London: Butterworth and Co., Bell Yard, Temple Bar. Price 2s. 6d. net.



IMPORTS AND EXPORTS, 1912-13.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910):—

	Imports.		Exports.		Re-Exportation.	
	1912.	1913.	1912.	1913.	1912.	1913.
January ...	£ 619	£ 12,097	£ 2,412	£ 4,005	—	£ 1,510
February ...	3,110	17,361	36	3,447	—	690
March ...	640	20,425	950	1,924	600	1,042
	4,369	49,883	3,398	9,376	600	3,242



Aeronautical Patents Published.

Applied for in 1912.

Published April 3rd, 1913.

6,810. A. J. WESTLAKE AND — KING. Aeroplanes.
26,265. SOC. ANON. DES AEROPLANES MORANE ET SAULNIER. Bonnets for rotary aeroplane engines.

Published April 10th, 1913.

6,461. N. A. THOMPSON. Running and alighting gear for flying machines.
27,770. W. I. TWOMBLY. Safety harness for aviators.
26,263. SOC. ANON. MORANE-SAULNIER. Aerial machines.

Published April 17th, 1913.

20,093. G. O'BRYAN. Flying machines.
22,628. A. J. A. DEPERDUSSIN. Aeroplane surfaces.
22,724. W. A. MACKAY. Safety devices for aviators.
23,066. J. WULFFING, P. W. SMITH AND AERIAL TRANSIT, LTD. Airships.

FLIGHT.

44, ST. MARTIN'S LANE, LONDON, W.C.

Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

SUBSCRIPTION RATES.

FLIGHT will be forwarded, post free, at the following rates:—
UNITED KINGDOM. ABROAD.

	s.	d.		s.	d.
3 Months, Post Free ...	3	9	3 Months, Post Free ...	5	0
6 " " " ...	7	6	6 " " " ...	10	0
12 " " " ...	15	0	12 " " " ...	20	0

Cheques and Post Office Orders should be made payable to the Proprietors of FLIGHT, 44, St. Martin's Lane, W.C., and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring FLIGHT from local news-vendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.